

NOVEL POLYPEPTIDES AND NUCLEIC ACIDS ENCODING SAME**RELATED APPLICATIONS**

- 5 This application claims priority to USSN 60/171,746, filed December 22, 1999, which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

- 10 Mammals are able to discriminate between thousands of odor molecules. This capacity
relies on a multigene family encoding 500 - 1000 olfactory receptors (ORX) *See* Buck et al.,
(1991) *Cell* **65**, 175-187. These receptors are expressed mainly in the olfactory epithelium and
have been found in a number of species including mammals, birds, amphibians, and fish. *See*
Buck et al., *supra*, (1991) *Cell* **65**, 175-187; Selbie et al., (1992) *Mol. Brain Res.* **13**, 159-163;
Rouquier et al., (1998) *Nature Genet.* **18**, 243-50.; Issel-Tarver et al., (1997) *Genetics* **145**, 185-
15 195; Sullivan et al., (1996) *Proc. Natl. Acad. Sci. USA* **93**, 884-888; Nef et al., (1992) *Proc. Natl.*
Acad. Sci USA **89**, 8948-8952; Leibovici et al., (1995) *Dev. Biol.* **175**, 118-131; Freitag et al.,
(1995) *Neuron* **15**, 1383-1392; Ngai et al., (1993) *Cell* **72**, 657-666.

- 20 All of these receptors belong to the G protein-coupled receptor (GPCR) superfamily and
share features of sequence and structure, such as seven hydrophobic transmembrane domains
(7TM).

 The sense of smell plays an important role in mammalian social behavior, location of
food and detection of predators. However, mammals vary in their olfactory ability. *See* Moulton
(1967) *Am. Zool.* **7**, 421-429; Stoddart (1980) *The ecology of vertebrate olfaction* (Chapman and
Hall, New York).

- 25 In primates, the sense of smell is greatly reduced (*i.e.*, microsmatic) with respect to
other mammals such as dogs or rodents. *See* Moulton, *supra*; Stoddart, *supra*; Issel-Tarver, L.,
Rine, J. (1996) *Proc. Natl. Acad. Sci. USA* **93**, 10897-10902.

- Various explanations for the differences in olfactory performance have been
hypothesized. Differences in the anatomical structures (size, location) devoted to olfaction could
30 partly explain these differences. For example, dogs, which have an olfactory sensitivity up to
100 times greater than humans, have on average ~100 cm² of olfactory epithelium while

humans have only 10 cm².

Variations in the size and diversity of the expressed ORX gene family could also account for these differences. It has recently been demonstrated that the human ORX gene repertoire is distributed in over 25 chromosomal sites. Over 70% of these ORX genes are pseudogenes, *i.e.* the sequences have accumulated deleterious mutations such as in-frame stop codons and/or indel frameshifts. See Rouquier et al., (1998) *Nature Genet.* **18**, 243-50. Thus, the reduction of the sense of smell observed in primates could parallel the reduction of the number of functional ORX genes.

SUMMARY OF THE INVENTION

The invention is based, in part, upon the discovery of novel polynucleotide sequences encoding novel polypeptides.

Accordingly, in one aspect, the invention provides an isolated nucleic acid molecule that includes the sequence an ORX nucleic acid molecule or a fragment, homolog, analog or derivative thereof. The nucleic acid can include, *e.g.*, a nucleic acid sequence encoding a polypeptide at least 80% identical to a polypeptide that includes the amino acid sequence of an ORX polypeptide. The nucleic acid can be, *e.g.*, a genomic DNA fragment, or a cDNA molecule.

Also included in the invention is a vector containing one or more of the nucleic acids described herein, and a cell containing the vectors or nucleic acids described herein.

The invention is also directed to host cells transformed with a vector comprising any of the nucleic acid molecules described above.

In another aspect, the invention includes a pharmaceutical composition that includes an ORX nucleic acid and a pharmaceutically acceptable carrier or diluent.

In a further aspect, the invention includes a substantially purified ORX polypeptide, *e.g.*, any of the ORX polypeptides encoded by an ORX nucleic acid, and fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition that includes an ORX polypeptide and a pharmaceutically acceptable carrier or diluent.

In still a further aspect, the invention provides an antibody that binds specifically to a ORX polypeptide. The antibody can be, *e.g.*, a monoclonal or polyclonal antibody, and

fragments, homologs, analogs, and derivatives thereof. The invention also includes a pharmaceutical composition including ORX antibody and a pharmaceutically acceptable carrier or diluent. The invention is also directed to isolated antibodies that bind to an epitope on a polypeptide encoded by any of the nucleic acid molecules described above.

5 The invention also includes kits comprising any of the pharmaceutical compositions described above.

 The invention further provides a method for producing an ORX polypeptide by providing a cell containing an ORX nucleic acid, *e.g.*, a vector that includes an ORX nucleic acid, and culturing the cell under conditions sufficient to express the ORX polypeptide encoded by the nucleic acid. The expressed ORX polypeptide is then recovered from the cell. Preferably, the cell produces little or no endogenous ORX polypeptide. The cell can be, *e.g.*, a prokaryotic cell or eukaryotic cell.

 The invention is also directed to methods of identifying an ORX polypeptide or nucleic acid in a sample by contacting the sample with a compound that specifically binds to the polypeptide or nucleic acid, and detecting complex formation, if present.

 The invention further provides methods of identifying a compound that modulates the activity of an ORX polypeptide by contacting an ORX polypeptide with a compound and determining whether the ORX polypeptide activity is modified.

 The invention is also directed to compounds that modulate ORX polypeptide activity identified by contacting an ORX polypeptide with the compound and determining whether the compound modifies activity of the ORX polypeptide, binds to the ORX polypeptide, or binds to a nucleic acid molecule encoding an ORX polypeptide.

 The invention also provides a method for assessing the olfactory acuity of a subject by providing a biological sample comprising nucleic acids from the subject, identifying a plurality of nucleic acid sequences homologous to an olfactory receptor nucleic acid sequence, determining the number of sequences containing open-reading frames, determining the number of sequences containing olfactory receptor pseudogenes, and comparing the number of open-reading frames to the number of pseudogenes to assess the olfactory acuity of the subject. In one embodiment, the invention provides a method of determining the plurality of nucleic acids using a pair of primers that selectively amplify an olfactory receptor nucleic acid sequence. In a further

embodiment, this pair of primers includes OR5B-OR3B (OR5B (TM2), 5'-
CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3'
(SEQ ID NO: 432) and 5'-AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ
ID NO:433). In a still further embodiment, the ratio of the number of sequences containing
5 open-reading frames to the number of sequences containing olfactory receptor pseudogenes is
calculated and compared to a reference ratio for an organism whose olfactory acuity is known.

Unless otherwise defined, all technical and scientific terms used herein have the same
meaning as commonly understood by one of ordinary skill in the art to which this invention
belongs. Although methods and materials similar or equivalent to those described herein can be
10 used in the practice or testing of the present invention, suitable methods and materials are
described below. All publications, patent applications, patents, and other references mentioned
herein are incorporated by reference in their entirety. In the case of conflict, the present
specification, including definitions, will control. In addition, the materials, methods, and
examples are illustrative only and not intended to be limiting.

15 Other features and advantages of the invention will be apparent from the following
detailed description and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic phylogeny tree of the primate species used in the Examples.

20 FIG. 2 is a comparison of the deduced protein ORX sequences obtained from the different
primate species characterized. The dendrogram was established using the PileUp program from
the GCG Package. Percent amino acid similarity (ASI) was determined by pairwise sequence
comparisons using the Gap program and is indicated along the abscissa of the tree. Sequences
obtained from the literature are indicated by an asterisk. For example, human ORX sequences
25 derived from the use of the OR3B/OR5B primers and representing the main ORX families were
selected from Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum.*
Mol. Genet. 7, 1337-1345. Dog (CfOLF1 and its human counterpart HsOLF1; CfOLF2) and
chicken (COR4) sequences were selected from Issel-Tarver et al. (1997) *Genetics* 145, 185-195
and Leibovici et al., (1996) *Dev. Biol.* 175, 118-131, respectively. ORX families (greater than
30 40% ASI) are indicated by open circles and subfamilies (greater than 60% ASI) are indicated by

open squares. The main family was arbitrarily named family 1 and subdivided in two groups of subfamilies, 1-I and 1-II , which are indicated by ovals. Group 1-II further comprises subfamilies A and B. Beside each sequence name, black dots indicate sequences derived from the use of the OR3B/OR5B consensus primers, black squares those derived from the OR3.1/7.1 consensus primers, and black rectangles indicate potentially functional genes (uninterrupted ORFs). In the case of HSA 912-93 (black rectangle and double asterisk), the sequence contains only one nonsense point mutation in human, but potentially codes in other primates. See Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. In FIG. 2, the following abbreviations are used: human, HSA; chimpanzee, PTR; gorilla, GGO; orangutan, PPY; gibbon, HLA; macaque, MSY; baboon, PPA; marmoset, CJA; squirrel-monkey, SSC and SBO; lemur, EFU and ERU; zebrafish, DRE.

DETAILED DESCRIPTION OF THE INVENTION

Included in the invention are the novel nucleic acid sequences and their polypeptides. The sequences are collectively referred to as "ORX nucleic acids" or "ORX polynucleotides" and the corresponding encoded polypeptides are referred to as "ORX polypeptides" or "ORX proteins." Unless indicated otherwise, "ORX" is meant to refer to any of the novel sequences disclosed herein.

The ORX nucleic acids and polypeptides are described in more detail below.

OR1

LOCUS AF127814 649 bp DNA PRI 28-FEB-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA13) gene, partial cds.
 ACCESSION AF127814
 KEYWORDS .
 SOURCE baboon.
 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,

Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

 /organism="Papio hamadryas"

 /db_xref="taxon:9557"

gene <1..>649

 /gene="PPA13"

CDS <1..>649

 /gene="PPA13"

 /codon_start=2

 /product="olfactory receptor"

 /translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILG

 TLLLTVMAYDRFVAVCHPLHYITIMNPRLCGLLVFVTWLIGVMTSLHISLMTHLTFC

 KDFEIPHFCELTHILQLACSDTFLNSTLIYVMTGVLGVFPLLGIHFSYSRIASSIRK

 MSSSGGKEKALSTCGSHLSVVSFLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID

NO:1).

BASE COUNT 128 a 188 c 130 g 203 t

ORIGIN

1 ctgggttgac atctgttca gcacctgcat cgtccccaag atgctggtga acatccagac

61 caagaacaaa acgatttctt acatggactg cctcaccag gtctatttct ccatgtttt

121 tctattcttg ggcacactac tctgaccgt gatggcctat gaccggttg tggcctctg

181 ccacccctg cactatataa ccatcatgaa ccccgccctc tgtggcctcc tggttttgt

241 cacgtggctc atgggtgtca tgacgtccct cctccatatt tctctgatga cacatctaac

301 cttctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacata tcctccagct

361 ggctgctct gatacttcc tgaacagcac gtgatatat gtatgacgg gtgtgctggg

421 cgttttccc ctcttgga tcattttctc ttattcacga atcgctcat ccataaggaa

481 gatgtctca tctgggggaa aagagaaagc actttctacc tgtgctctc acctctccgt

541 cgttcttta ttatggga caggcattgg ggtccactc acttctcgg tgactcattc

601 tcccagaac atctccgtg cctcggtgat gtacacggtg gttaccccc (SEQ ID NO:2).

OR2

LOCUS AF127815 642 bp DNA PRI 28-FEB-2000

DEFINITION Papio hamadryas PPA14 pseudogene, partial sequence.

ACCESSION AF127815

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

 Papio.

REFERENCE 1 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for

 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,

 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..642

 /organism="Papio hamadryas"

/db_xref="taxon:9557"
 gene <1..>642
 /gene="PPA14"
 /pseudo

5 BASE COUNT 123 a 171 c 125 g 223 t
ORIGIN

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 121 cgcatgatg gaaagtctgc tctggctgt gatggcctat gaccgggttg tggccatctg
 181 tcacccccta cactgcccag tcacatgaa cccacgcctt tgtggtttt tagtttgg
 241 gtctttctt cttagcctgt tggattccca gctacacaat ttgattgtgt tacaacttac
 301 ctgcttcaat gatgtggaat tctctaaatt ttctgtgac cttctcaac ttctcaatcc
 361 tagcctgctc tgacacataa catagtcgta tattttattg gtaccatatt tggttttctt
 421 cctctctcag ggatcctttt cttttactat aaaattgttt cctccattcc gagagtgcgc
 481 tcttcaggta ggaagtataa agccttctcc acctgcagct ctcaccttc agttgtttgc
 541 ttatttatg gaacagccct tggagggtac ctcagttcag ctgtctctct cccccccagg
 601 aagggtgcag cggcctcagt gatgtacatg gtggtcaccc cc (SEQ ID NO:3).

OR3

20 LOCUS AF127816 649 bp DNA PRI 28-FEB-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA15) gene, partial cds.
 ACCESSION AF127816
 KEYWORDS .

25 SOURCE baboon.
 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.

30 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

35 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

40 FEATURES Location/Qualifiers
 source 1..649
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"

45 gene <1..>649
 /gene="PPA15"

CDS <1..>649
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 /codon_start=2
 /product="olfactory receptor"
 50 /translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD
 TLLLTVMAYDRFVAVCHPLHYITIMNPRLCGLLVFVTWLIGVMTSLLHISLMTHLTFC
 KDFEIPHFCELTHILQLACSDTFNLSTLIYVMTGVLGVFPLLGIIIFSYSRIASSIRK
 MSSSGGKEKALSTCGSHLSVVSFLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID

NO:4).

BASE COUNT 130 a 188 c 128 g 203 t

ORIGIN

1 ctgggttgac atctgtttca gcacctgcat cgtccccaag atgctggtga acatccagac
61 caagaacaaa acgattttct acatggactg cctcaccag gtctatttct ccatgtttt
121 tcttattctg gacacactac tctgaccgt gatggcctat gaccggttg tggccgtctg
181 ccacccctg cactatataa ccatcatgaa ccccccctc tgtggcctcc tggttttgt
241 cacgtggctc attggtgtca tgacatccct cctccatatt tctctgatga cacatctaac
301 cttctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacata tctccagct
361 ggctgctct gatacttcc tgaacagcac gttgatatat gttatgacgg gtgtgctggg
421 cgtttttccc ctcttggga tcattttct ttattcaga atcgctcat ccataaggaa
481 gatgtctca tctgggggaa aagagaaagc actttctacc tgtggtctc accttccgt
541 cgtttcttta tttatggga caggcattgg ggtccacttc acttctgagg tgactcattc
601 ttccagaac atctcgtgg cctcgtgat gtacacggtg gttaccccc (SEQ ID NO:5).

OR4

LOCUS AF127817 649 bp DNA PRI 28-FEB-2000

DEFINITION Papio hamadryas olfactory receptor (PPA16) gene, partial cds.

ACCESSION AF127817

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>649

/gene="PPA16"

CDS <1..>649

/gene="PPA16"

/codon_start=2

/product="olfactory receptor"

/translation="WVDICFSTCIVPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD

TLLLTVMAYDRFVAIYHSLHYTVIMSPRLCGLLVLSWCISVMGSLLETTLTVRLSFC

IKMEIPHFFCDLPEVLKLACSDTFINNVVIYFATGILAVIPFTGILFSYYKIVFSVLR

ISSAGGKYKAFSTCGSHLSMVSLFYGTGLGVYLSSAIPSSRTSLVASVMYTMVTP" (SEQ ID

NO:6).

BASE COUNT 130 a 176 c 136 g 207 t

ORIGIN

1 ctgggttgac atctgtttca gcacctgcat cgtccccaag atgctggtga acatccagac
61 caagaacaaa acgattttct acatggactg cctcaccag gtctatttct ccatgtttt

361 ggccctgctct gataccttcc tgaacagcac gttgatatat gttatgacgg gtgtgctggg
 421 cgtttttccc ctcttgga tcattttctc ttattcacga atcgcttcat ccataaggaa
 481 gatgtcctca tctgggggaa aagagaaagc actttctacc tgtggtctc accttccgt
 541 cgtttcttta tttatggga caggcattgg ggtccacttc acttctgcgg tgactcatc
 601 ttcccagaac atctccgtgg cctcgtgat gtacacgggtg gttaccccc (SEQ ID NO:9).

OR6

LOCUS AF127819 649 bp DNA PRI 28-FEB-2000

DEFINITION Papio hamadryas olfactory receptor (PPA42) gene, partial cds.

ACCESSION AF127819

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

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/db_xref="taxon:9557"

gene <1..>649

/gene="PPA42"

CDS <1..>649

/gene="PPA42"

/codon_start=2

/product="olfactory receptor"

/translation="LVDFCLATNTIPKMLVSLQTRSKAISYPCCLTQMYFFHFFGIVD

SIHAMMAYDRFVAICHPLHYATIMSPRLCGLLVGVPWAFSCFISLTHILLMARLVFC

GSHEVPHYFCDLTPILRLSCTDTSVNRIFILIVAGMVIATPFICILASYARILAAIMK

VPSAGGRKKAFSTCSSHLSVVALFYGTTIGVYLCSSVRTAVKEKASAVMYTAVTP" (SEQ ID

NO:10).

BASE COUNT 111 a 224 c 146 g 168 t

ORIGIN

1 cctggttgat ttctgtctgg ccaccaaac catcccaag atgctggtga gcctcaaac

61 caggagcaag gccatctct atccctgctg cctgaccag atgtactct tccatttct

121 cggcatcgtg gacagcatca taatgccat gatggcttat gaccggttcg tggccatctg

181 ccaccggtg cactacgcca ccatcatgag ccacgcctc tgtggtctgc tggcggcgt

241 ccctggggcg ttttctgtct tcattctct caccacatc ctctgatgg cccgcctcgt

301 ttctgcggc agccacgagg tgcctcacta ctctgcgac ctactcca tctccgact

361 ttctgcgaca gacacatcag tgaacaggat ctctatctc attgtggcag ggatgggtgat

421 agccacgccc ttcattgca tcttggttc ctatgctgc atcttgcgg ccatcatgaa

481 ggtccctct gcaggcgga ggaagaaagc ctctccacc tgcagctccc acctgtctgt

541 gggtgtctct ttctatgga ccaccattgg tgtctatctg tgcctctct cgttcgcac

601 ggctgtgaag gagaaagctt ctgccgtgat gtacacagca gtcaccccc (SEQ ID NO:11).

OR7

5 LOCUS AF127820 641 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas PPA43 pseudogene, partial sequence.
ACCESSION AF127820
KEYWORDS .
SOURCE baboon.
10 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 641)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 641)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
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/db_xref="taxon:9557"
gene <1..>641
/gene="PPA43"
30 /pseudo
BASE COUNT 126 a 172 c 123 g 220 t
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61 gcatagcaga gtcactctcc acgcggactg cctggcacag atgtcttct ttgtccttt
35 121 tgcatgtata gatgacatgc tcctgactgt gatggcctat aactgatttg tggccatctg
181 tcacccctg cactaccag tcatcatgaa tctcacttc tgtgtcttct tagttttggt
241 gtcttttcg tcagcgtgtt ggattcccag ctgcacaatt tgattgtgtt acaacttacc
301 tgcctcaatg atgtggaaat ctctaaatt ttctgtgacc ctctcaact tctcaatcct
361 agcctgctct gacacataac atagtcgtat atttattgg taccatattt ggtttcttc
40 421 ctctctcagg gatccttttc ttactata aaattgttc ctccattcag agagtgcgt
481 ctcaggttag gaagtataaa gccttctcca cctgcagctc tcaccttca gttgtttgct
541 tatttatgg aacagccctt ggagggtacc tcagtcagc tgtctcttc cccccagga
601 aggtgtgcagc ggcctcagt atgtacatgg tggtcacccc c (SEQ ID NO:12).

OR8

45 LOCUS AF127821 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA68) gene, partial cds.
ACCESSION AF127821
50 KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
5 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
10 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Papio hamadryas"
15 /db_xref="taxon:9557"
gene <1..>649
/gene="PPA68"
CDS <1..>649
/ gene="PPA68"
20 /codon_start=2
/product="olfactory receptor"
/translation="FIDVCFVSTTPKMLVNIQTQSRVITYAGCITQMCFFIFFAGLD
IFMLTVMAYDRFVAICHPLHYTVTMNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
ADLEIPHFCELNQVVHLACSDTFLNDMVMYLASALLGGGALSGILYSYSKIVSSIRG
25 TSSAQGKYKAFSTCASHLSVVSFLFYGTLLGVYFSSAATRNSHSSAAAASVMYTVVTP" (SEQ ID
NO:13).
BASE COUNT 122 a 177 c 146 g 204 t
ORIGIN
30 1 cttcatagac gtctgttttg tgcaccacac tgcctcgaag atgctggtga acatccagac
61 acagagcaga gtcacacac atgcaggctg catcacccag atgtgctttt tcataattct
121 tgcgggactg gatactttta tgcctaccgt gatggcctat gacagggttg tggccatctg
181 tcacccctg cactacacgg tcaccatgaa cccagggctc tgggactgc tggttctggc
241 gtcttgatc atgagtgcgc tgaattcttc gttgcaaagc ttaatggatg tgcaccttc
301 cttctgtgca gacttgaaa ttccccactt ttctgtgaa cttaatcagg tggccacac
35 361 tgcctgttct gacaccttc ttaatgacat ggtgatgtat ttggcatctg cgctgctggg
421 cgggtggtgc ctctctggga tctttattc ttattctaag atcgtttct ccatacgtgg
481 aacctcgtca gtcagggga agtacaaggc atttccacc tgtgcatctc acctctcgg
541 tgtctcctta tttatgga cgctcctagg agtgacttt agttctgctg caaccgtaa
40 601 ctcacactca agtgctgcag cctcgggtgat gtacacttg gttaccccc (SEQ ID NO:14).
OR9
LOCUS AF127822 649 bp DNA PRI 28-FEB-2000
DEFINITION Papio hamadryas olfactory receptor (PPA72) gene, partial cds.
45 ACCESSION AF127822
KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
50 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for

TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 5 source 1..649
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>649
 /gene="PPA79"
 10 CDS <1..>649
 /gene="PPA79"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDVSYATSIVPQLLAHFLAEHKAISLQSCAAQLFFSLALGGIE
 15 FVLLAVMAYDRYVAVCDPLRYSATMHGALCAKLAITSWVSGSINSLMHTTTITFQLPMC
 TNKFINHIFCEILAVIRLACVDTSNEVTIMVSSIVLLMTPLCLVLLSYIRIISTILK
 IQSREGRRKAFHTCASHLTVVALCYGMAIFTYIHPHSSPSVLQEKLISLFYAILTP" (SEQ ID

NO:17).

BASE COUNT 135 a 185 c 133 g 196 t

ORIGIN

1 cctgtcgat gtctctatg ccacaagcat agtcctcag ctgctggcac atttcttgc
 61 agaacataaa gccatctcgt tgcagagctg tgcagcccaa ttattttct ccctggcctt
 121 ggggtgggatt gagttgttc tcctggcagt gatggcctat gaccgctatg tggctgtgtg
 181 tgacccctg cgatactcag ccacatgca tggagcgcta tgtgctaagt tggccatcac
 241 atcctgggtc agtggatcca ttaactctct catgcatacc accatcacct ttcagctgcc
 301 catgtgcaca aacaagtta ttaatcatat attctgtgaa atttagctg tgatcaggct
 361 ggcttgtgtg gacacctcct ccaacgaggt caccatcatg gtgtctagca ttgtctctt
 421 gatgacaccc ttatgtctgg ttctttgtc ttacatcggg atcatctcca ccattctaaa
 481 gatccagtc agagaaggaa ggaggaaagc cttccacacg tgtgcctctc acctcacagt
 541 ggttgccctg tgctatggca tggccatttt cacttacatc catccccact ccagtcctc
 601 tgccttcag gagaagtga tctctctctt ttatgccatt tgacacca (SEQ ID NO:18).

OR11

35 LOCUS AF127824 649 bp DNA PRI 28-FEB-2000
 DEFINITION Pan troglodytes olfactory receptor (PTR12) gene, partial cds.
 ACCESSION AF127824
 KEYWORDS .
 SOURCE chimpanzee.
 40 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 45 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 50 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649

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/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene      <1..>649
/feature   /gene="PTR12"
5  CDS      <1..>649
/feature   /gene="PTR12"
/feature   /codon_start=2
/feature   /product="olfactory receptor"
10 /feature   /translation="FLEIGFNLVIVPKMLGTLAQDTTISFLGCATQMYFFFFFFGVAE
CFLLATVAYDRYVAICSPVIMNQRTRAKLAAASWFGFPVATVQTTWLFSFPFC
RTNKVNHFFCDSPVLRVCADTALFEIYAIVGTILVVMIPCLLILCSYTRIAAILK
IPSAKGKNKAFSTRSSHLLVVSIFYISLSLTIFRPKSNNSPEGKKLLSLSYTVMT" (SEQ ID

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NO:19).

BASE COUNT 132 a 193 c 129 g 195 t

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15 ORIGIN
1  ttctctggag attgcttca acctagtcac tgtgcccaaa atgctgggga cctgcttgc
61  ccaggacaca accatctcct tccttgctg tgccactcag atgtattct tcttctctt
121  tggagtgtc gaagtctcc tcttgctac cgtggcatat gaccgctatg tggccatctg
181  cagtcccttg cactaccag tcacatgaa ccaaaggaca cgggccaaac tggctgctgc
20 241  ctctggttc ccaggcttc ctgtagctac tgtgcagacc acatggctct tcagtttcc
301  attctgtgc accaacaagg tgaaccactt ctctgtgac agcccactg tctgaggct
361  ggtctgtgc gacacagcac tgttgagat ctacgccatc gtcggaacca ttctggtggt
421  catgatcccc tgcttctga tcttgtgtc ctactctgc attgctgctg ccactctcaa
25 481  gatcccatca gctaaaggga agaataaagc ctttctaca cgctcctcac acctcctgt
541  tgtctctct tctatatat cattaagcct cacatatctt cggcctaaat caataattc
601  tctgagggc aagaagctgc tatcgtgtc ctactgtt atgactccc (SEQ ID NO:20).

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OR12

```

30 LOCUS AF127825 650 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR2 pseudogene, partial sequence.
ACCESSION AF127825
KEYWORDS .
SOURCE chimpanzee.
35 ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
40 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..650
50 /organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>650
/feature /gene="PTR2"
/feature /pseudo

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BASE COUNT 127 a 202 c 131 g 190 t

ORIGIN

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1 ctttggac atctgtctt cctccacc cgtccccaag atgctggcca atcacatact
61 cgggactcag accatctcct tctgtggctg ttcacacag atgtatttcg tttcatgct
121 tgtggacatg gacaattcc tctagctgt gatggcctat gaccgcttg tcgccgtgtg
181 ccaccctta cattacacag caaagatgac ccatcagctc tgtgccctgc tggttgctgg
241 attatgggtg gttgccaacc tgaatgtcct tctgcacacc ctgctgatgg ctcgactctc
301 attctgtgca gacaatgccca tccctcactt ctctgcat gtgactcccc tactgaaact
361 ctctgtcga gacacacacc tcaatgaggt cataatcctt agtgagggtg ccttggtcat
421 gatcacccca tttcttga tcttggttc ttatagcac atcacctgca ctgtctgag
481 ggtccatcc acaaaggga ggtggtgtaagc ctctccacc tgtggtctc acctggctgt
541 ggttctacct ctctatgac accatcattg ctgtgtatt taacctctg tctccact
601 cagcagagaa agacactacg gctactgtgt gtatacagt agtgactccc (SEQ ID NO:21).
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OR13

LOCUS AF127826 649 bp DNA PRI 28-FEB-2000

DEFINITION Pan troglodytes PTR3 pseudogene, partial sequence.

ACCESSION AF127826

KEYWORDS .

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Pan troglodytes"

/db_xref="taxon:9598"

gene <1..>649

/gene="PTR3"

/pseudo

BASE COUNT 146 a 166 c 121 g 216 t

ORIGIN

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61 ggaagacaga accatctcct tcacaggatg catcatgcaa ttctctctgg cgtgtatatg
121 tgcagtggca gaaacattca tgctggcagt gatggcctat gattgatacg tggcagtggtg
181 taacctttg ctctacacag ttgtcaggtc ccagaaactc tgtcatcat tagtggcagg
241 gccctacaca tggggataaa tctcttctct gacactcacc tatttctct tgcattatc
301 ctctgtggg tctaacatca tcaataattt tgtctgtgag gactctgtca tcattctgt
361 ctctgtctct gacctctaca tcagccaaat gcttgtttt gtcattgcaa tattcaatga
421 ggtgagcagc ttgggagtca tctctactac ctatatttc atctttattg ctgtcataaa
481 aatgccttct gctgttgggc accaaaaagc ttctctacc tgtgcttccc acctgactgc
541 catcactatt ttcatggga ctgtcctgtt cctttattgt gtacccaact ccaaaaactc
601 atggctcata gtcaaagtag gttctgtgtt ttatacagtc atcatcccc (SEQ ID NO:22).
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OR14

LOCUS AF127827 651 bp DNA PRI 28-FEB-2000
5 DEFINITION Pan troglodytes PTR4 pseudogene, partial sequence.
ACCESSION AF127827
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
15 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 651)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..651
/organism="Pan troglodytes"
25 /db_xref="taxon:9598"
gene <1..>651
/gene="PTR4"
/pseudo
BASE COUNT 131 a 166 c 134 g 220 t
30 ORIGIN
1 ctgtctgac atcggttca cctccaccac ggtcccaag atgattgtgg acatccagtc
61 tcacagcaga gtcattctct atgcaggctg cctgactcag atgtctctct ttgccatttt
121 tggaggtatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg ttgtagacca
181 tctgtcacct atatcggtca gccatctta acccgtgttt ctgtggcttc ctagatttgt
35 241 tgtctttttt tttttctca gtccttcaga ctcccagctg cacaacttga ttgccttaca
301 aatgacctgc ttcaaggatg tggaaattcc taatttcttc tgggaacctt ctcaactctc
361 ccatcttgca tgtgtgaca ccttcaccag gaacatcagt attccctgc tgccatatt
421 gggtttcttc ctatctcaca gatcatttct tctactata aaattgttcc ctccatgctg
481 agtgtttcat catcaggtgg gaagtataaa gccttctcca actgtgggtc tcccctgtca
40 541 gttgtttgct tattttatgg gaaaggcatt ggggggtacc tgagttcaga tgtgtcatct
601 tccccagaa aggggtcagt ggcctcagtg atgtacacgg tgataccgc c (SEQ ID NO:23).

OR15

45 LOCUS AF127828 657 bp DNA PRI 28-FEB-2000
DEFINITION Pan troglodytes PTR5 pseudogene, partial sequence.
ACCESSION AF127828
KEYWORDS .
SOURCE chimpanzee.
50 ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 657)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 657)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 10 source 1..657
 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>657
 /gene="PTR5"
 15 /pseudo
 BASE COUNT 128 a 173 c 137 g 219 t
 ORIGIN
 1 cttgcctgac atcggttca cctccagcat ggtccccaag atgattgtgg acatccagtc
 61 tcacagcaga ctcatctct aggcaggctg cctgactccg atgtccctct ttgccatttt
 20 121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctattaccg ttgtggcca
 181 tctgtcacc tatatatcat tcaaccatca tgaacccgtg ttctgtggc ttctagttt
 241 tgtgtcttt tttttttt cagtcttta gacgccagc tgcacaact gattgcctta
 301 caaatgacct gctcaagga tgtggaaatt cctaattct tctgggaacc ttctcaact
 361 ccccatctg catgttgca caccctcacc aataacataa tcattgatt ccctgctgcc
 25 421 atattgggt ttctcccat ctgggggacc ctttctctt attataagat tgttctctc
 481 attctgaggg ttcatcatc aggtgggaag tataaggcct gtccacctg tgggtctcac
 541 ctgtcagtg ttgctgatt ttatggaaga tgcgtggag ggtacctag ttcatgtg
 601 tcattctcc tgagatagc tgcagtggc tcagtgatg acacggtgt caccccc (SEQ ID NO:24).
 30 **OR16**
 LOCUS AF127829 657 bp DNA PRI 28-FEB-2000
 DEFINITION Pan troglodytes PTR6 pseudogene, partial sequence.
 ACCESSION AF127829
 35 KEYWORDS .
 SOURCE chimpanzee.
 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 40 REFERENCE 1 (bases 1 to 657)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 45 REFERENCE 2 (bases 1 to 657)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 50 FEATURES Location/Qualifiers
 source 1..657
 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>657

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/ gene="PTR6"
/ pseudo
BASE COUNT 133 a 171 c 131 g 222 t
ORIGIN
5      1 ctgcctgac atcagttca cctccatcac agtecccaag atgattgtgg acatctagtc
      61 tcacagcaga gtcattgct atgcagggtg cctgactcag atgtctctct ttgccatgtt
      121 tggaggcatg gaagagagac atgctcctga atgtgatggc ctatgtccgg ttgtagcca
      181 tctgtacccc tctatatcat tcagccatca tgaacccgtg tttctgtggc ttctacttt
      241 tgttgtcttt tttttttt gcggtcttt agatgcccag ctgcacaaca tgattgcctt
10     301 acaaacgacc tgctcaagg atgtggaaat tcctaattt ttctgtgac ctctcaact
      361 accccacctt gcatgtgtg acaccttcac caataacatc atcatgtatt tccctgtgc
      421 cctatttgtt ttcttccca tctcggggac cctttctct tactgtaaaa ttgttctc
      481 cattctgagg gtttcatcat caggtgggaa gtataaacct tctccacctg tgggtctcac
      541 ctgtcagttt ttgctgatt ttatggaaaa ggcgttggag ggtacctcag ttcagatgtg
15     601 tcattctccc tgagaaaggc tgcagtggcc tcagtgtatg acaagatggt cactccc (SEQ ID NO:25).

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OR17

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LOCUS AF127830 650 bp DNA PRI 28-FEB-2000
20  DEFINITION Pan troglodytes PTR7 pseudogene, partial sequence.
    ACCESSION AF127830
    KEYWORDS
    SOURCE chimpanzee.
    ORGANISM Pan troglodytes
25     Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
        Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
30 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
35 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
    Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
    source 1..650
        /organism="Pan troglodytes"
40        /db_xref="taxon:9598"
    gene <1..>650
        /gene="PTR7"
        /pseudo
BASE COUNT 122 a 168 c 127 g 233 t
45  ORIGIN
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      61 tcacagtaga ctactctct acgtaggctg cctgactcag atgtctttt tgatccttt
      121 cgcatgatg gaaagtctg tctgattgt gatggcctat gaccgggtcg tgaccatctg
      181 tcacccctg cactaccaag tcactcatgag ccacgactc tgtggcttct tagttttgt
50     241 gtctttttt cttagccttt tggactctca gctgcacaat ttgattgtgt tacaacttac
      301 ctgcttcaac gatgtagaaa tctctaattt tttctgtga ccttcttaa ctctcaacc
      361 tggcctgttc tgacactcc attataaca tggttgtata tttattggt gccatattg
      421 gtttctccc tctctaggg atcctttct ctactataa aattgttcc tccattctga
      481 gagttctctc ttcaggtggg aagtataaag cttctccac ctgcagctct cacctgtcag

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541 ttgtttgctt attttatgga acagcccttg gagggtagct cagttcagct gtgtcccttt
 601 cctccaggaa ggggtgcagt gcctcagtga tgtacatggt ggtcaccccc (SEQ ID NO:26).

OR18

LOCUS AF127831 663 bp DNA PRI 28-FEB-2000
 DEFINITION Pan troglodytes PTR8 pseudogene, partial sequence.
 ACCESSION AF127831
 KEYWORDS .
 SOURCE chimpanzee.
 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pan.
 REFERENCE 1 (bases 1 to 663)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 663)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..663
 /organism="Pan troglodytes"
 /db_xref="taxon:9598"
 gene <1..>663
 /gene="PTR8"
 /pseudo
 BASE COUNT 129 a 171 c 139 g 224 t
 ORIGIN
 1 cttgcctgac atcggtttca cctccaccac ggtccccaag atgattgtgg acatccagtc
 61 tcacagcaga gtcatttctc atgcaggctg cctgactcag atgtctctct ttgccatttt
 121 tggaggcatg gaagagagac atgctcctga atgtgacggc ctatgaccgg ttgttagcca
 181 tctgtcaccc tctatatcgt tcagccatct tgaaccctg tttctgtggc ttctaggtt
 241 tttgtctt gattttttt tttttctcag tcttttagac tcccagctgc acaactgat
 301 tgccttaca atgacctgct tcaaggatgt ggaaattcct aatttctcc gggaaccttc
 361 tcaactcccc catctgcat gttgtgacac cttcactagg aacatcaaca tgtattttct
 421 tgctgccata ttgggtttc ttcccatctc ggggaccctt ttctctact gtaaaattgt
 481 ttctccatt ctgagggtt catcatcagg tgggaagtat aaaccttcac cacttgtggg
 541 tctcacctgt cagttgttg ctgattttat ggaacaggcg ttggagggtg cctcggttca
 601 gatgtgcat cttcccgag aaagggtgca gtggcctcag tgatgtacac ggtggtcacc
 661 ccc (SEQ ID NO:27).

OR19

LOCUS AF127832 677 bp DNA PRI 28-FEB-2000
 DEFINITION Pan troglodytes PTR9 pseudogene, partial sequence.
 ACCESSION AF127832
 KEYWORDS .
 SOURCE chimpanzee.
 ORGANISM Pan troglodytes
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 677)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 677)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..677

/organism="Pan troglodytes"

/db_xref="taxon:9598"

gene <1..>677

/gene="PTR9"

/pseudo

BASE COUNT 129 a 170 c 143 g 235 t

ORIGIN

1 cttgactgac atcggtttca cctccatcac agtccccaag atgattgtgg acatctagtc

61 tcacagcaga gtcattctgct atgcagggtg cctgactcag atgtctctct ttgccatttt

121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatggccgg ttgtagcca

181 tctgtcaccc tccatatcgt tcagccattt tgaaccctg tttctgtggc ttcttagatt

241 tgtgtcctt gttttttt gttttttt gtttttct caggctttta gactccacg

301 tgcacaactt gattgcctta caaatgacgt gtttcaagga tgtggaaatt cctaatttct

361 tctgggaacc ttctcaactt gcccatcttg catgttgtaa caccttcacc aggaatatca

421 acctgtattt ccttctgcc gtatttgggt ttcttcccat ctcggggacc cttttctct

481 actgtaaaat tgtttctctc attctgaagg ttcatcatc aggtgggaac tataaagcct

541 tctccaccctg tgggtctcac ctgtcagttg ttgcttatt ttatggaaca ggcgttggag

601 ggtacctcag ttcatgtgtg tcattctccc ccagaaaggg tgcagtggcc tcagtgtgt

661 acacgggtgc caccccc (SEQ ID NO:28).

OR20

LOCUS AF127833 643 bp DNA PRI 28-FEB-2000

DEFINITION Hylobates lar HLA45 pseudogene, partial sequence.

ACCESSION AF127833

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 643)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 643)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..643
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>643
 /gene="HLA45"
 /pseudo

BASE COUNT 131 a 168 c 127 g 217 t

ORIGIN

1 ctgggctgac atcactttca cctcggccat ggttccaag atggtgtgg acatgcagtc
 61 gcatagcaga gccatctct atgcaggctg cctgacacag atgtcttct ttgtccttt
 121 gcatgtatag aagacatgct cctgactctg atggcctatg accgatttgt ggccatctgt
 181 caccctctgc actaccagct catcgtgaat cctcacctct gtgtcttctt agttttgttg
 241 tctttttcc tagcctgtt ggattcccag ctacacagct ggattgtgtt tacaattcac
 301 cttcttcaag aatggaaatc tctaatttt tctgtgaccc gtctcaact ctaaccttg
 361 cctgttctga cagcatcatc gataacatat tataatatta gatagcccta tatttggtt
 421 tcttccatt tcaggatcc tttgtctta gtataaatt gtctcccca ttccgagaat
 481 tccatcatca gatgggaagt ataaagcctt ctccacctgt ggctctcacc tggcagttgt
 541 tgcattttat gaaacaggca ttggcgtgta cctgacttca gctgtgcat catccccag
 601 gaatggtgtg gtggcgtcag tgatgtatgc tgtggtcacc ccc (SEQ ID NO:29).

OR21

LOCUS AF127834 648 bp DNA PRI 28-FEB-2000

DEFINITION Hylobates lar HLA46 pseudogene, partial sequence.

ACCESSION AF127834

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>648
 /gene="HLA46"
 /pseudo

BASE COUNT 131 a 170 c 143 g 204 t

ORIGIN

1 ctggctgac atctgtttca cctccaccac gatgcccaag atgttggtga acatccaggc
 61 acagactcaa tccatcagtt acacaggctg cctcacccaa atctgctttg tcttggttt
 121 tgttggtatt gaaaatggaa ttctgtgcat gatggcctat gatcgatttg tggccatctg
 181 tcaccactg aggtacaatg tcatcatgaa cccaaactct gtgggctgct gcttctgctc
 241 tcttcatca ttagtgtctt ggacgtctg ctgcacacgt tgatggtgct acggctgacc

301 ttctgcacag acctggaaat tccccacttt ttctgtgaac tagctcatgt tctcaagctc
 361 gcctgttctg atgtctctcat taataacatc ctggtgtatt tggtagccgg cctgttaggt
 421 gttgttctc actctgggat cattttctct tacacacgaa ttgcctctc tgcataaaa
 481 attccattag ctggttgaaa gtataaagct tttccatct gcgggtcaca cttaatcgtc
 5 541 gtttcttgt tctatggaac aggggttggg gtgtacctta gttctggggc taccactcc
 601 tctaggcagg gtgcaatagc atcagtgatg tataccgtgg tcaccccc (SEQ ID NO:30).

OR22

10 LOCUS AF127835 660 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar HLA47 pseudogene, partial sequence.
 ACCESSION AF127835
 KEYWORDS .
 SOURCE common gibbon.
 15 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 660)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 660)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..660
 30 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>660
 /gene="HLA47"
 /pseudo
 35 BASE COUNT 127 a 182 c 137 g 214 t
 ORIGIN
 1 ctgcctgac atcggttca ctccaccac agtcccaag attattgtg acatcaaac
 61 tcacagcaga gtcattctc aggcaggctg cctgactcag acctctctt ttgccattt
 121 tggaggcatg gaagagagac acgtctctga gtgtgatggc ctatgaccgg ttgtagcca
 40 181 tctgtaccc tctatatcat tcggccatga tgaaccctg tttctgcggc ttctagtgt
 241 tgtgtcttt ttttttct tctcagtct ctagactccc agctgcacaa ctgattgcc
 301 ttgctaacga cctgcttcaa ggggtcggaa attcctaatt tctctgtga cccttctcaa
 361 ccccccatc ttgcatgtt tgacacctc accaataaca taatcatgta tttctctgt
 421 gccgtattg ggttctctc catctcggg acccttctc ctactataa aatgggttcc
 45 481 tcattctga ggttctcgc gtcaggtgg aagtataaag ccttctccac ctgtgggtct
 541 catctgtcag ttgtttctg agttatgga agaggcgtg gaggatacct cagttcagat
 601 gtgtctctt ccccgaaaa ggttgcagtg gcctcagtga tgtacacgtt ggtcaccccc (SEQ ID NO:31).

OR23

50 LOCUS AF127836 649 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar olfactory receptor (HLA48) gene, partial cds.
 ACCESSION AF127836
 KEYWORDS .

SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

5 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

10 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

15 FEATURES Location/Qualifiers
 source 1..649
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>649
 /gene="HLA48"
 CDS <1..>649
 /gene="HLA48"
 /codon_start=2
 /product="olfactory receptor"
 /translation="WVDICFGTCHPKMLVNIQTKNKAISYMDCLTQVYFSMLFPILD
 TLLLTVMAYDRFVAICHPLHYMIIMNPRLCGLLIFVIWLIGVMTSLLHISLMMHLIFC
 KDFEIPHFFCELTHILQLARSDTLNSTLIYFMTGVLGVFPLLGIIFSYSRIASSIRK
 MSSSGGKQKALSTCGSHLSVVSFLFYGTGIGVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID
 NO:32).

30 BASE COUNT 133 a 190 c 124 g 202 t
 ORIGIN
 1 ctgggtgac atctgttgc gcaactgcat catccccaag atgctggtga acatccagac
 61 caagaacaaa gccatctcct acatggactg cctcacacag gtctatttct ccatgctttt
 121 tectattctg gacacgctac tctgaccgt gatggcctat gaccggtttg tggccatctg
 35 181 ccacctctg cactacatga tcatcatgaa cccccgcctc tgtggcctcc tgatttttgt
 241 catctggctc atgggtgtca tgacatccct cctccatatt tctctgatga tgcactaat
 301 ctctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacaca tctccagct
 361 ggcccgctct gatacttcc tgaacagcac gttgatatac ttatgacag gtgtgctggg
 421 cgttttccc ctcctggga tcattttct ttattcacga attgctcat ccataaggaa
 40 481 gatgtcctca tctgggggaa aacaaaaagc actttccacc tgtgggtctc acctctccgt
 541 tgtttttta tttatggga caggcattgg ggtccacttc acttctgcag tgactcacgc
 601 ttccagaaa atctccgtgg cctcgggtgat gtacactgtg gtcaccccc (SEQ ID NO:33).

OR24

45 LOCUS AF127837 649 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar olfactory receptor (HLA5) gene, partial cds.
 ACCESSION AF127837
 KEYWORDS .

50 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Hylobates lar"

/db_xref="taxon:9580"

gene <1..>649

/gene="HLA5"

CDS <1..>649

/gene="HLA5"

/codon_start=2

/product="olfactory receptor"

/translation="WVDICFSTCIIPKMLVNIQTKNKAISYMDCLTQVYFSMLFPILD

TLTLLTVMAYDRFVAICLPLHYMIIMNPRLCGLLIFVIWLIGVMTSLLHISLMMHLIFC

KDFEIPHFCELTHILQLACSDTFLNSTLIYFMTGVLGVFPPLGIIFSYSRIASSIRK

MSSSGGKQKALSTCGSHLSVVSIFYGTGIGVHFTSAVTHASQKISVASVMYTVVTP" (SEQ ID

NO:34).

BASE COUNT 133 a 189 c 124 g 203 t

ORIGIN

1 ctgggttgac atctgttca gcacttgcac catccccaag atgctggtga acatccagac

61 caagaacaaa gccatctcct acatggactg cctcacacag gtcatttct ccatgctttt

121 tcctattctg gacacgctac tctgaccgt gatggcctat gaccggttg tggccatctg

181 cctccctctg cactacatga tcatcatgaa ccccgccctc tgtggcctcc tgattttgt

241 catctggctc attggtgtca tgacatccct cctccatatt tctctgatga tgcattctaat

301 ctctgtgaaa gattttgaaa ttccacattt ttctgcgaa ctgacacaca tcctccagct

361 ggctgctct gataccttc tgaacagcac gttgatatac ttatgacag gtgtgctggg

421 cgtttttccc ctcttggga tcattttct ttattcacga attgcttcat ccataaggaa

481 gatgtctca tctgggggaa aacaaaaagc acttccacc tgtgggtctc acctctcgt

541 tgttttttta tttatggga caggcattgg ggtccacttc actctgcag tgactcacgc

601 ttccagaaa atctccgtgg cctcggtgat gtacacggtg gtcaccccc (SEQ ID NO:35).

OR25

LOCUS AF127838 651 bp DNA PRI 28-FEB-2000

DEFINITION Hylobates lar HLA6 pseudogene, partial sequence.

ACCESSION AF127838

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 651)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 651)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
 source 1..651
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>651
 /gene="HLA6"
 /pseudo
 BASE COUNT 127 a 176 c 139 g 209 t
 ORIGIN

15 1 cttgcctgac atcggtttca ccaccaccac ggtcccgag atgattgtgg acatccaatc
 61 tcacagcaga gtcattctct aggcaggccg cctgactcac atgtctctct ttgccatttt
 121 tggaggcatg gaagagagac atgtcctga gtgtgatggc ctatgacagg ttgttagcca
 181 tctgtcacc tctatatcat tcagccatca tgaaccctg tttctgtggc ttctagtgtg
 241 tctttttt ctctcagtct tttagaggcc cagctgcata acttgattgc ctgctaattg
 301 acctgcttca aggatgtgga aattcctaata ttctctgtg acccttctca actccgccat
 20 361 ctgcatgtt gtgacatctt caccaataac ataatcatgt atttctctgc tgcctgattt
 421 ggggtccttc ccatctcggg gaccctttcc tctactata aaatgggttc ctccattctg
 481 aggcattcat cgtcagggtg gaagtataaa gccttctcca cctgtgggtc tcacgtgtca
 541 gttgtttgct gagtttatgg aagaggcgtt ggagggtacc tcagttcaga tgtgtcctct
 601 tccccagaa agtttgcagt ggccctcagt atgtacacgg tggtcacccc c (SEQ ID NO:36).

OR26

LOCUS AF127839 644 bp DNA PRI 28-FEB-2000
 DEFINITION Hylobates lar HLA7 pseudogene, partial sequence.
 30 ACCESSION AF127839
 KEYWORDS .
 SOURCE common gibbon.
 ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 35 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 644)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

40 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 644)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 45 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 source 1..644
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 50 gene <1..>644
 /gene="HLA7"
 /pseudo
 BASE COUNT 130 a 168 c 128 g 218 t
 ORIGIN

1 ctgggctgac atcactttca cctcggccat ggttcccaag atgattgtgg acatgcagtc
61 gcatagcaga gccatctctt atgcaggctg cctgacacag atgtctttct ttgtcctttt
121 tgcatgtatg gaagacatgc tctgactct gatggcctat gaccgatttg tggccatctg
181 tcacccctg cactaccag tcacgtgaa tctcacctc tgtgtcttct tagttttgtt
5 241 gtctttttc cttagcctgt tggattcca gctacacagc tggattgtgt ttacaatcca
301 ccttcttcaa gaatggaaat ctctaattt ttctgtgacc cgtctcaact tctcaacctt
361 gcctgttctg acagcatcat cgataacata ttatatatt agatagccct atatttggtt
421 ttctcccat ttcagggatc ctttgtctt agtataaaat tgtctcccc attctgagaa
481 ttccatgcgc agatgggaag tataaagcct tctccacctg tggtctcac ctggcagttg
10 541 ttgcatttta tgaacagcgc attggcgtgt acctgacttc agctgtgtca tcaccccca
601 ggaatgggtg ggtggcgta gtgatgatg ctgtgtcac cccc (SEQ ID NO:37).

OR27

15 LOCUS AF127840 649 bp DNA PRI 28-FEB-2000
DEFINITION Hylobates lar olfactory receptor (HLA74) gene, partial cds.
ACCESSION AF127840
KEYWORDS .
SOURCE common gibbon.
20 ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
25 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
30 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
35 /organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>649
/gene="HLA74"
CDS <1..>649
40 /gene="HLA74"
/codon_start=2
/product="olfactory receptor"
/translation="FVDFCYSTTITPKLLENLVVEYRTISFTGCIMQFFLVCIFVGTE
TFMLAVMAYDRCVAVCNPLLYTVAMSQRLCSLLVATSYSWGIVCFLTLTYFLELSFR
45 GNNIINN FVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLMMIFTSYAFIFITVMK
MPSTGGRKKAFSTCASHLTAITIFHG TILFLYCVPSKSSWLMVKVTSVFYTVFIP" (SEQ ID
NO:38).
BASE COUNT 142 a 157 c 129 g 221 t
ORIGIN
50 1 cttgttgat ttctgtatt ctactacgat tacacccaaa ctgctggaga acttggtgt
61 ggaatataga actatttctt tcacaggatg catcatgcaa ttctccttg tctgcatatt
121 ttaggggaca gaaacattca tgctggcagt gatggcctat gaccgatgtg tggcgggtg
181 taacctctt ctctacacag ttgcaatgac ccagaggctt tgctcttgt tggtggtac
241 atcatactct tgggggatag tctgttctt gacacttacc tactttctac tgggaattac

SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

5 REFERENCE 1 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

10 REFERENCE 2 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

15 FEATURES Location/Qualifiers
 source 1..662
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>662
 /gene="HLA8"
 /pseudo

20
 BASE COUNT 124 a 178 c 143 g 217 t
 ORIGIN
 1 gtcacctgac gtcggtttca cctccaccac ggtcccgag atgattgtgg acacccattc
 25 61 tcacagcaca gtcattctct aggcaggctg cctgactcag atgcctctct ttgccatttt
 121 tggaggcatg gaagagagac aagctcctga gtgtgatggc ctatgaccgg ttgttagcca
 181 tctgtcacc tcatactct tcagccatca tgaatccgtg tttctgtggc tacctagttt
 241 tgtgtcttt tttttttt ttcgcagtcg ttagactcc cagctgcaca acttgattgc
 301 ctgctaatt acctgcttca gggatgcgga aattcctaatt tcttctgtg acccttctca
 361 actccccat ctgcatgtt gtgacacct caccaataac ataactcatg tattccctg
 421 ctgccatatt tggtttctt cccatctcgg ggaccctttt ctcttctgt aaaattgttt
 481 cctccgttct gagggtttca tcgtcaggta ggaagtataa agccttctcc acctgtgggt
 541 ctacactgtc agttgtttgc tgagtttatg gaagaggcgt tggagggtac gtcagttcag
 601 atgtgtcttc tccccaga aagggtgcag tggcctcagt gatgtacatg atggtcaccc
 35 661 cc (SEQ ID NO:41).

OR30

LOCUS AF127843 662 bp DNA PRI 28-FEB-2000

40 DEFINITION Gorilla gorilla GGO1 pseudogene, partial sequence.
 ACCESSION AF127843
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

45 REFERENCE 1 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

50 REFERENCE 2 (bases 1 to 662)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..662
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>662
/gene="GGO1"
/pseudo

BASE COUNT 127 a 180 c 135 g 220 t

ORIGIN

1 cttgactgac atcggtttca cctccaccac agtccccaag atgattgtgg acatccagtc
61 tcacagcaga gccatctect atgcacgctg cctgactcag atgtctctct ttgccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg ttgttagcca
181 tctgtcaccc tctgtatcgt ccagccatct tgaacccctg ttctgtggc ttctagatt
241 cgtgtgctct gttttttt tttttctc agtcttttag actcccagct gcacaacttg
301 attgccttac aaatgacctg cttcatggat gtggaaatc ctaattctt ctgggaacct
361 tctcaactcc cccatcttgc atgtgtgac acctcacca ggaacatcaa cctgtatttc
421 cctgtgcca tatttggtt tcttccatc tgggggacce ttctctta ctataaaatt
481 gtttctcca tctgaaggt tcatcaggt gggaagtata aaccttctcc gcctgtggtt
541 ctcacctgac agttgtttac tgattttatg gaacaggcgt tggagggtac ctcgggtcag
601 atgtgtcatc ttccccgaga aagggtgcag tggcctcagt gatgtacacg gtggtcaccc
661 cc (SEQ ID NO:42).

OR31

LOCUS AF127844 650 bp DNA PRI 28-FEB-2000

DEFINITION Gorilla gorilla GGO17 pseudogene, partial sequence.

ACCESSION AF127844

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 650)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 650)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..650
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>650
/gene="GGO17"
/pseudo

BASE COUNT 129 a 170 c 137 g 214 t

ORIGIN

1 ttttctgac ctctgtttta cctccacgac tgtcccaaag atgttactga atatactgac

61 acagaacaaa ttcataacat atgcaggctg tctcggtcag attttttt ttacttcat
 121 ttgatgcct ggacaattta ctctgactg tgatggccta tgaccgcttc tggccatct
 181 gtcacccct gcactatacg gtcacatga acccccgct ctgtggactg ctggtcttg
 241 ggtcctggtg catcagtgc atgggtccc tgctcgagac ctgactgtt ttgaggctgt
 301 ccttctgcac caaatggaa attccacact tttttgtga tcttctgaa gtctgaagc
 361 tcgctgttc tgacacctc attaataacg tggatataa ctttgcaact ggcgtcctgg
 421 gtgtgattcc ctctactgga atattttct ctactataa aattgtttc tctatactga
 481 ggatttcctc agctgggaga aagcacaagg cgtttccac ctgtgttcc cacctctcag
 541 tggtcacctt gttctatggc acgggcttg gggctatct cagtctgca gccacacat
 601 cttctaggac aagtctggtg gcctcagta tgacacat ggtcaccccc (SEQ ID NO:43).

OR32

LOCUS AF127845 649 bp DNA PRI 28-FEB-2000

DEFINITION Gorilla gorilla olfactory receptor (GGO18) gene, partial cds.

ACCESSION AF127845

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>649

/gene="GGO18"

CDS <1..>649

/gene="GGO18"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKMLVNIQTHNKVITYAGCITQMCFFLLFVGLD

NFLLTVMAYDRFVAICHPLHYMVMNPQLCGLLVLASWIVGVLSMLQSLMVLPLPFC

THMEIPHFCEINQVVHLACSDTFNLNDIVMYFAVALLGGGPLNGILYSYSKIVSSIRA

ISSAQGKYKAFSTCASHLSVVSFLFYGTCLGVYLSSAATHNSHTGAAASVMYTVVTP" (SEQ ID

NO:44).

BASE COUNT 136 a 172 c 134 g 207 t

ORIGIN

1 ctctgtagac atctgtttg tctctaccac tgtcccgaag atgctggtga acatccagac

61 acagaacaaa gtcacacct atgcaggctg catcacccag atgtgcttt tctactctt

121 ttagtagattg gataacttc tctgaccgt gatggcctat gaccggttg tggccatctg

181 tcacctctg cactacatgg tcattatgaa cctcaactc tgggactgc tggttctggc

241 gtctcgatc gtgggtgtc tgaattccat gttacaaagc ttaatggtgt tggcactgcc

301 cttttgtaca cacatggaaa tccctcattt tttctgtgaa attaactagg tggccacct

361 tgcctgttct gacaccttc ttaatgacat agtgatgtat ttgcagtag cactgctggg
 421 cggtgggtccc ctcaatggga tctgtactc ttactctaag atagtttct ccatacgtgc
 481 aatctcatca gctcagggga agtataaggc atttccacc tgtgcatctc acctctcagt
 541 tgtctcctta tttatggta catgcttagg ggtgtacctt agttctgctg caaccacaa
 5 601 ttcacacaca ggtgctgcag cctcagtgat gtacactgtg gtcaccccc (SEQ ID NO:45).

OR33

LOCUS AF127846 649 bp DNA PRI 28-FEB-2000
 10 DEFINITION Gorilla gorilla olfactory receptor (GGO19) gene, partial cds.
 ACCESSION AF127846
 KEYWORDS .
 SOURCE gorilla.

ORGANISM Gorilla gorilla

15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 20 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

25 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>649

/gene="GGO19"

CDS <1..>649

/gene="GGO19"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD

TFLLAVMAYDRFVAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHVLLMKRLTFS

TGTEIPHFCEPAQVLKVACSNLLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR

40 TSSTKGKYKAFSTCGSHLCVVSIFYGTGLGVYLSSAVTHSSQSSSMASVMYAMVTP" (SEQ ID

NO:46).

BASE COUNT 118 a 189 c 144 g 198 t

ORIGIN

1 ctttgggac atctgttca tctccaccac agtccccaag atgctagtga acatccaggc

45 61 acggatcaaa gacatctct acatgggggtg cctcactcag gtgtatttt taatgatgtt

121 tgcctggaatg gatactttcc tactggctgt gatggcctat gaccgggttg tggccatctg

181 ccacccctcg cactacacgg tcacatgaa cccctgcctc tgggctcc tggttctggc

241 atcttgggtc atcattttct ggttctcgt ggttcattt ctactgatga agagggtgac

301 ctctccaca ggcactgaga ttccgattt ctctgtgaa ccggtcagg tcctcaaggt

50 361 ggctgtctct aacacccctc tcaataacat tgtctgtat gtggccacgg cactgctggg

421 tgtgtttct gttagtggga tctcttctc ctactctcag attgtctct ccttaatgag

481 aacgtctcc accaaggga agtacaaagc ctttccacc tgtgcatctc acctctgtgt

541 ggtctcttg ttctatggaa caggacttg ggtctatctg agttctgctg tgaccattc

601 ttccagagc agtccatgg cctcagtgat gtacgcatg gtcaccccc (SEQ ID NO:47).

OR34

LOCUS AF127847 649 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO2) gene, partial cds.
 ACCESSION AF127847

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>649

/gene="GGO2"

CDS <1..>649

/gene="GGO2"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICVTSTTVPKTLNIRTQSKVITYAGCITQMYFFILFVVLD

SLLLTVMAYDRFVAICHPLHYTVIMNSWLCGLLVLSWIVSILCSPLQSIMALQLSFC

TELKIPHFFCELNQVVHLACSDTFIKDMMMNFTSVLLGGGCLAGIFYSYFKILCCICS

ISPAQGMNKALSTCASHLSVVSIFYCTGVGVYLSSAATHNSLSNAAASVMTVVTS" (SEQ ID

NO:48).

BASE COUNT 146 a 166 c 129 g 208 t

ORIGIN

1 cttttagac atctgtgta cctccaccac agtcccaaag acactgtcaa acatccggac
 61 acagagcaaa gtcacacct atgcaggttg catcaccag atgtactttt ttatacttt
 121 ttagtggtg gacagcttac tctgaccgt gatggcctat gaccggttg tggccatctg
 181 tcacccctg cactacacag tcattatgaa ctctggctc tgggactgc tggttctggt
 241 gtcctggatc gtgagcatcc tatgttctcc gttacaaagc ataatggcat tgcagctgct
 301 cttctgtaca gaattgaaaa tccctcattt ttctgtgaa cttaatcagg tcgtccacct
 361 tgcctgttct gacactttta ttaaagacat gatgatgaat ttacaagtg tgctgttggg
 421 tgggggatgc ctgctggaa tattttactc ttactttaag atactttgtt gcatatgttc
 481 aatcaccac gctcagggga tgaataaagc actttccacc tgtgcatctc acctctcagt
 541 tgtctctta tttattgta caggcgtagg tgtgtacctt agttctgctg caaccataa
 601 ctactctca aatgctgcag cctcagtgat gtacaccgtg gtcacctcc (SEQ ID NO:49).

OR35

LOCUS AF127848 649 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO3) gene, partial cds.

ACCESSION AF127848
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>649
 /gene="GGO3"
 CDS <1..>649
 /gene="GGO3"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDTSFISTTVPKMLVNIQARIKDISYMGCLTQVYFLMMFAGMD
 TFLAVMAYDRFVAICHPLHYTVIMNPCLCGLLVLASWFIIFWFSLVHILLMKKL TFS
 TGTEIPHFFCEPAQVLKVACSNLTLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR
 TSSTEGKYKAFSTLWISLCVVSLFYGTGLGVYLSSAVTHSSQSSSMASVMYAVVTP" (SEQ ID
 NO:50).
 BASE COUNT 117 a 194 c 143 g 195 t
 ORIGIN

1 ctttgtggac acctcttca tctccaccac agtecccaag atgctagtga acatccaggc
 61 acggatcaaa gacatctct acatgggggtg cctcactcag gtgtatttt taatgatgtt
 121 tgctggaatg gatacttcc tactggccgt gatggcctat gaccggttg tggccatctg
 181 ccacccctg cactacacgg tcactcatgaa cccctgcctc tgtggcctcc tggttctggc
 241 atcttggttc atcattttt ggttctccct gggtcatatt ctactgatga agaagttgac
 301 cttctcaca ggcaactgaga ttccgcattt cttctgtgaa ccggctcagg tcctcaaggt
 361 ggccgtctct aacacccctc tcaataacat tgtcttgat gtggccacgg cactgctggg
 421 tgtgtttct gtagctggga tcctcttctc ctactctcag attgtctct ccttaatgag
 481 aacgtctcc accgagggca agtacaagc ctttccacg ctgtggatct ccctctgtgt
 541 ggtctccttg ttctatgaa caggactgg ggtctatctg agttctgctg tgaccactc
 601 ttccagagc agctccatgg cctcagtgtg gtacgccgtg gtcaccccc (SEQ ID NO:51).

OR36

LOCUS AF127849 650 bp DNA PRI 28-FEB-2000
 DEFINITION Gorilla gorilla GGO4 pseudogene, partial sequence.
 ACCESSION AF127849
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..650
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>650
/gene="GGO4"
/pseudo

BASE COUNT 134 a 164 c 132 g 220 t

ORIGIN
1 cttggctgag attggttca tctcggtcgc ggttccaag atgacgtgg acatgcagtc
61 acatagcaga gtcactcct atcggggccc cctgacacag atgtcttct ttgcctttt
121 tgcattgatg gatgacatgc tccggactct gatggcctat gaccgatttg tggccatctg
181 tcacccctg cactaccag tcatcatgaa tctcacctc tgtgtctct tagttttgt
241 gcctttttc cttagcctgt tggattcca gctgcacagc tggattgtgt tacaattcac
301 ttgcttcaag aatgtggaaa tatctaatt ttatgtgat ccatctcaac ttctaaact
361 tgactgtct gaacagtgtc atcaatagca tattcacata ttagatagt actatgtttg
421 gtttcttcc cattcaggg atcctttgt ctactataa aattgtccc tccattctaa
481 gaattccatc gtcagatggg aagtataag ccctctccac ctgtggctct cacctgtcag
541 ttgtttgctt atttatgga ataggcattg gcgtgtacct gacttcagct gtgtcaccac
601 caccaggaa tgggtgtgtg gcatcagtga tctacgcgt ggtcaccccc (SEQ ID NO:52).

OR37

LOCUS AF127850 650 bp DNA PRI 28-FEB-2000
DEFINITION Gorilla gorilla GGO70 pseudogene, partial sequence.
ACCESSION AF127850
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 650)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..650

097471561230

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        /organism="Gorilla gorilla"
        /db_xref="taxon:9593"
gene      <1..>650
        /gene="GGO70"
5         /pseudo
BASE COUNT  128 a  170 c  134 g  218 t
ORIGIN
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    61 tcacagcagg ttcatctct atgcaggctg cctgactcag atatctctct ttgccattt
10   121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgaccgg ttgtagcca
    181 tctgtcacc tctatatcat tcagccatca tgaaccctg tttctgtgc ttctagatt
    241 tgctgtctt ttttctttc ttttctcag tcttttagat ggctgactgc agaacttgat
    301 tgccttaaa atgacctgct tcgaggatgt gggaattcct aatttctct gtgacccttc
    361 tcaactgccc catctacat gttgtgacat cttaccaat cacataatca tgtatttccc
15   421 tgctgcata ttgtgtttc ttcccatctc ggggacctt ctcttacc atgtaattgt
    481 ttctccatt ctgagggtt catcatctat gggagggtga aagcctccc cacctgtgag
    541 ttgtttgctg atattatgga acaggcttcg gaggggtacct cagttcagat gtgttatctt
    601 caacaagaaa ggctgcagtg gcctcagtga tgtacacggt ggctcacgcc (SEQ ID NO:53).
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OR38

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LOCUS  AF127851  649 bp  DNA      PRI    28-FEB-2000
DEFINITION  Gorilla gorilla olfactory receptor (GGO71) gene, partial cds.
ACCESSION  AF127851
25  KEYWORDS  .
SOURCE  gorilla.
    ORGANISM  Gorilla gorilla
        Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
        Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
30  REFERENCE  1 (bases 1 to 649)
    AUTHORS  Giorgi,D.G. and Rouquier,S.P.
    TITLE    The olfactory gene repertoire in primates and mouse: evidence for
            reduction of function in primates
    JOURNAL  Unpublished
35  REFERENCE  2 (bases 1 to 649)
    AUTHORS  Giorgi,D.G. and Rouquier,S.P.
    TITLE    Direct Submission
    JOURNAL  Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
            Montpellier Cedex 5 34396, France
40  FEATURES  Location/Qualifiers
    source    1..649
            /organism="Gorilla gorilla"
            /db_xref="taxon:9593"
    gene      <1..>649
            /gene="GGO71"
45  CDS       <1..>649
            /gene="GGO71"
            /codon_start=2
            /product="olfactory receptor"
50  /translation="FADLCFTSTTVPKMLLNILTQNKFITAGCLGQIFFFTSFGCLD
    NLLLTVMAYDRFVAICHPLHYTVIMNPRLCGLLVLGSWCISVMGSLLTTLTVLRLSFC
    TKMEIPHFCDLLEVLKLACSDTFINNVVIYFATGVLGVIPFTGIFFSYKIVFSILR
    ISSAGRKHKAFSTCGSHLSVVTLFYGTGFGVYLSSAATPSSRTSLAASVMYTMVTP" (SEQ ID
NO:54).
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BASE COUNT 130 a 171 c 136 g 212 t

ORIGIN

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1 tttgctgac ctctgttta cctccacgac tgcctccaaag atgttactga atatactgac
61 acagaacaaa ttcataacat atgcaggctg tctcggtcag atttttttt tcacttcatt
121 tggatgcctg gacaatttac tcttgactgt gatggcctat gaccgcttcg tggccatctg
181 tcacccccctg cactatacgg tcatcatgaa cccccggctc tgtggactgc tggttctggg
241 gtcttggtgc atcagtgtca tgggttcctt gctcgagacc ttgactgttt tgaggctgtc
301 cttctgcacc aaaatggaaa ttccacactt ttttctgat cttctgaag tctgaagct
361 cgctgttct gacacctca ttaataacgt ggtgatatac ttgcaactg gcgtcctggg
421 tgtgattccc ttactggaa tattttctc ttactataaa attgtttct ctatactgag
481 gatttctca gctgggagaa agcacaagc gtttccacc tgtggtccc acctctcagt
541 ggtcaccttg tctatggca cgggcttgg ggtctatctc agttctgcag ccacaccatc
601 ttctaggaca agtctggcgg cctcagtgat gtacaccatg gtcaccccc (SEQ ID NO:55).
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OR39

LOCUS AF127852 649 bp DNA PRI 28-FEB-2000

DEFINITION Eulemur fulvus olfactory receptor (EFU35) gene, partial cds.

ACCESSION AF127852

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirhini; Lemnridae; Eulemur.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>649

/gene="EFU35"

CDS <1..>649

/gene="EFU35"

/codon_start=2

/product="olfactory receptor"

/translation="LTDICLSTATVPKMLANIRTRSQSITYAACLTQMCFVLGSATLE

NFLLAVMAYDRYVAICHPLRYAVIMNLRLCGFLILLSLISIMDTLLHDLMLVRLSFC

THLEIPLFFCEVVQVIKLACSDTLINLLIYFAAGVLGGVPLSGIIFSQTQIASSVLR

MASASGKYKAFSTCGSHLSVVSLLYGTGLGVYISSAFMHSPTMAVASMMYTVVTP" (SEQ ID NO:56).

BASE COUNT 123 a 176 c 148 g 202 t

ORIGIN

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1 cctcactgac atctgtttaa gcacagccac cgtcccaaag atgctggcaa acatccgaac
61 acggagtcag agcatcacgt atgcagcctg cctcaccag atgtgcttg ttctgggttc
121 tgctacgttg gaaaattttc tctggcagt aatggcttat gaccgctatg tggccatctg
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181 tcatacctctg agatacgcgg tcatacatgaa ccttcgtctc tgtggcttct tgatccttt
 241 gtcctctgtct attagcatca tggacaccct gctccacgat ctgatggctc tgcggctgtc
 301 cttctgcaca cacctggaga taccctctt cttctgcgag gttgtgcaag tcataagct
 361 tgcctgttct gatacctca tcaataacct ctgatatat ttgcagctg gcgtgttggg
 421 aggtgttct ctgtctggga tcaatttctc ttatactcag attgcctcct ctgttttgag
 481 aatggcatca gcaagtggaa agtataaagc ttttccacc tgtggctctc acctctcggt
 541 tgtgtccttg ctctacggga caggttggg ggtgtacatc agttctgcgt ttatgcactc
 601 tcccaggacg atggcagtgg ctcaatgat gtacacggtg gtcactccc (SEQ ID NO:57).

OR40

LOCUS AF127853 645 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus EFU36 pseudogene, partial sequence.
 ACCESSION AF127853
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 645)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 645)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..645
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>645
 /gene="EFU36"
 /pseudo
 BASE COUNT 118 a 189 c 138 g 200 t
 ORIGIN

1 ctttctgtac gtctgttca cctccaccac ggtgccaag atgttagtga acatccaggc
 61 gcacagcaag gccatcacat acaaaggctg cctcaccag atgtgtttt tcttgatttt
 121 tgggtggcta gtttctact gacggtgatg gcctatgacc ggttcgtggc catctgtcac
 181 cccctgcgct acatggatcat catgaacccc aggctctgtg gtcttctgct tctctttct
 241 tgggtgatct gcttgacgta ttctctgtg caaagtctga tggttttgag ggtgtccttc
 301 tgccaagaaa tagaatccc ccactacttc tgtgaacttg ctcagatcct cacgctcgcc
 361 tgctctgaca ccctagttaa tgacgtctcg ctgtatttc tatctgctct gctcgggtgt
 421 attcccctga ctgggatcct ttattcttat tcagaatta tctctccat aatgtgcatt
 481 tctctgtctg gaggggaagta caaagccttt tcacactgtg ggtctcacct ctccgtcgtc
 541 tcttctgtct acggtacagg ccttggggtc tacctaactt ctgaacagc ccagccctcc
 601 agaagggggt caatagcctc ggtgatgtac accatgtgca ccccc (SEQ ID NO:58).

OR41

LOCUS AF127854 647 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus EFU37 pseudogene, partial sequence.

ACCESSION AF127854
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 5 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 647)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 10 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 647)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 15 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..647
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 20 gene <1..>647
 /gene="EFU37"
 /pseudo
 BASE COUNT 118 a 192 c 141 g 196 t
 25 ORIGIN
 1 cttgttgac atctgtttca cctccaccac catecccaag atgactgtgg acatcctaac
 61 tcacagcaga gtcactctct ctgggggctg tctgaccag atgtctcttg ctctgctttt
 121 tgtttgtgtg gatgatatgc ttctgaccgt gtcggcctgt gacctgttg tggccatctg
 181 ccacccctg cactacacgg tcatcatgaa cccccacttc tgtggcctcc tggttctgat
 241 atcttggttc atcatgtccc tgggtgtcct gggtcacctc ctactgataa ggaggctgac
 301 attcccccagg gccacagaaa tcccacatta ctctgtgaa ctggctcaaa ttctcaaagt
 361 ggcccactct gacagcttca tcaataacat ctctgtgtac ttgtcggctg tttgtctggg
 421 tgtgtttccc atcacaggga tctctactc ctactctaaa attgtctct ccgtaatgag
 481 gatgtctgcc actgcaggca agaagaaagc attttccacc tgtgggtctc atttgtgtgg
 35 541 tctgctgtgt ctatggaaca gggcttgggg tctacctcag ctctctgtg accccttctt
 601 cccagagcag cagcattgcc tcagtgtgt actcgtgtgt caccccc (SEQ ID NO:59).

OR42

40 LOCUS AF127855 652 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer ERU38 pseudogene, partial sequence.
 ACCESSION AF127855
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 45 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 50 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..652
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>652
/gene="ERU38"
/pseudo

BASE COUNT 124 a 191 c 136 g 201 t

ORIGIN

1 cttgttgac atctgttca cctccaccac catccccaag atgctggga acattgacac
61 acacagcaaa gacatctct acgtgggatg cctcactcag atgtatttt tcatggtgtt
121 tgggtggactg gacaacttc tctgaccgt gatggcctgt gaccggtttg tggccatctg
181 tcacccctg cactatgcag tacagtcatc atgaaccccc gcttctgtgc cctcctggtt
241 ctgatgtctt ggttcatcat gtcctggat gccctgggtc atgttctact tatactgagg
301 ctgacctttt ccttagaaac tgaatccca catttctct gtgacctggc tcagatgctc
361 gaggtggccc gctctgacac cttatcaat aacatctgct tgtacttgt ggctgtgttg
421 ctgtatgttt cctgtcacgg ggatcctcta cccctactct aaaattgtct cctccttaat
481 gaggatgtcc tccactgcag gcaagaagaa agcattttcc acctgtgggt ctcacctctc
541 tgtggtctc ttgtctatg gaacaggact tggggtctac ctaagttctg ctgtgacccc
601 ttctcccag agcagcgcca ttgcctcagt gatgtacaca gtagtcacc cc (SEQ ID NO:60).

OR43

LOCUS AF127856 648 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur rubriventer ERU39 pseudogene, partial sequence.
ACCESSION AF127856

KEYWORDS

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>648
/gene="ERU39"
/pseudo

BASE COUNT 132 a 173 c 141 g 202 t

ORIGIN

1 ctttgacag atctgttttg tgtccaccac tgtccagag atgctgaatg tgcagacatg

61 gagcaaagtc atatectaca caggctgcat caccagatg gacttttct tgctcttgt
 121 aggactggac aacttctcc tgaccgtgat ggcctgtgac cggtttgtgg ccatctgtca
 181 cccctgcac tatgcagtac agtcatcatg aacccaggc tctgtgcatt tctgttctg
 241 gtgttctgga tctctagtg cctgaattcc ttgtacaaa gcttaatggt gttgcagata
 301 accttctgta cagacttga aatccccac ttttctgtg aactaatca gataatccac
 361 ctgctctgtt tgacacctt tctaatgac atggtgatgt attggcagt gatgctgctg
 421 ggtggggggg gccttactgg gatcctttac tcttactcta agatagtffc ctccgtacgt
 481 gcaatctcct cggctcaggg gaagtataaa gcattttcca cctgtgcatc tcacctctcg
 541 gtcgtctcct tattttattg tacatgccta ggggtgtacc tcagtctgc tacacacaac
 601 tcacactcca gcgcaacagc ctcggtgatg tacacggtgg tcactccc (SEQ ID NO:61).

OR44

LOCUS AF127857 649 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer olfactory receptor (ERU40) gene, partial cds.
 ACCESSION AF127857
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>649
 /gene="ERU40"
 CDS <1..>649
 /gene="ERU40"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LSDICFTSTTIPKMLVNLHAHSDKDISYRECLTQVYFFMIFAGLD
 NFLLTVMAYDRFVAICHPLHYMVIMNPRFCALLVLMSWFIMSLVALVHVLLILRLTFS
 LETEIPHSCEVAQILKVARSDTFNNICLYLSAVLLGVFPVMGILFSYSKIVSSLMR
 MSSTSAKNKAFSTCGSHLCVVSLFYGTALGVYLLSAVTPSSQSSAIASVMYTVVTP" (SEQ ID
 NO:62).
 BASE COUNT 119 a 187 c 131 g 212 t
 ORIGIN
 1 cctttctgac atctgtttca cctctaccac catcccaaag atgctggtga acctcacgc
 61 acacagcaaa gacatctcct acagggagtg ctcactcag gtgtattttt ttatgatttt
 121 tgctggactg gataatttcc tctgaccgt gatggcctat gaccggttg tggccatctg
 181 ccacccctg cactacatgg tcatcatgaa tccccgcttc tgtgccctcc tggttctcat
 241 gtcttggttc atcatgtctc tggttgccct ggttcatgt ctactatat tgaggctgac
 301 ttttctcta gaaactgaaa tccacattt ctctgtgag gtggtcaga ttctcaaggt

361 ggcccgctct gacaccttct tcaataacat ctgcttatac ttgtcggtgctg tgtgtcggg
421 tgtgtttccc gtcattgggga tctctctc ctactctaaa attgtttcat ccttaatgag
481 ggtgtctccc acttcagcaa agaataaagc atttccacc tgtgggtctc acctctgtg
541 ggtctcttgg tctataggaa ctgcacttgg ggtctacctc agctctgctg tgaccttct
601 ttccaccatg agcgccattg cctcagtat gtacacggtg gtaccccc (SEQ ID NO:63).

OR45

LOCUS AF127858 648 bp DNA PRI 28-FEB-2000
10 DEFINITION Eulemur fulvus EFU56 pseudogene, partial sequence.
ACCESSION AF127858
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
20 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
25 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..648
/organism="Eulemur fulvus"
30 /db_xref="taxon:13515"
gene <1..>648
/gene="EFU56"
/pseudo
BASE COUNT 131 a 180 c 142 g 195 t
35 ORIGIN
1 cttttagac atctatattg tctctaccac ggtcccaaag atgctggtga atatcaagac
61 acacagcaaa gccatatcct acgcaggctg tgtcaccag atgcactttt gcataacgtt
121 tgcagagtag gcattcttct cctgactgtg atggcctatg actggtttgg ggccatctgt
181 cacccttcgc actatgtgct catcatgaac ccaggctct gtgcactgct tgttctggtg
40 241 tcttggatca tgagtgtcct gaattccttg ttgcaaagct taatggtgtt gccactgccc
301 ttctgtgcag agttggaaat cccccagttt ttctgtgaac ttaatcagat aatcctcctt
361 gcctgttctg acacttttct taatgacgtg gtgatgtatt tggcagctat gctactgggt
421 gagggggtgcc ttactgggat cctttactct tactctaaga tagtttccct cgtactgtga
481 atctctcgg ctacgggggaa gtataaagca tttccacct gtgcattcca cctctcggtc
541 gtctccttat tttactgcac aagcctcggg gtgtacctcg gctctgctgc tacacacaac
4 601 tcacactcca gcgcacacgc ctccgtgatg tacacggtgg tcactccc (SEQ ID NO:64).

OR46

50 LOCUS AF127859 643 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU57) gene, partial cds.
ACCESSION AF127859
KEYWORDS .
SOURCE Eulemur fulvus.

ORGANISM *Eulemur fulvus*
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; *Eulemur*.

REFERENCE 1 (bases 1 to 643)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 643)
 10 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 15 source 1..643
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>643
 /gene="EFU57"
 20 CDS <1..>643
 /gene="EFU57"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADICFVSTTVPEMLNVQTWSKVISYTGCTQMDFFLLFVGLDN
 25 FLLTVMAYDRFVAICHPLRYAVIMNPRLCVFLVLVSWILSVLNSLSQSLMVLRLTFCT
 DLEIPHFFCELNQIIHLACSDTFLNDVVMYLAVMLLGGGCLTGILYSYSKIVSSVRAI
 SSAQ GKCKAFSTCASHLLVVSIFYCTCLGVYLSSATHNSHSSATASVMYTVVTP" (SEQ ID
 NO:65).
 BASE COUNT 127 a 171 c 143 g 202 t
 30 ORIGIN
 1 cttgcagac atctgttttg tgtccaccac tgtccagag atgctgaatg tgcagacatg
 61 gagcaaagtc atatcttaca caggctgcat caccagatg gacttttct tgcctttgt
 121 aggactggac aacttctcc tgaccgtgat ggcctatgac cggtttgtgg ccatctgtca
 181 cccctgcgc tatgcagtca tcatgaacc caggctctgt gtatttctg ttctggtgc
 35 241 ctgtagctg agtgctctga attcctgtc acaaagctta atggtgttc ggctaacct
 301 ctgtacagac ttggaatcc cccactttt ctgtgaactt aatcagataa tccacctgc
 361 ctgttcggac acctttctta atgacgtggt gatgtattg gcagtgatgc tgctgggtgg
 421 gggatgcctt actgggatcc ttactctta ctctaagata gtttctccg tacgtgcaat
 481 ctctcggct caggggaagt gtaaagcatt ttccacctgt gcattcacc tcttggtcgt
 40 541 ctcttattt tattgtacat gcctaggggt gtacttgagt tctgtacac acaactcaca
 601 ctccagcgca acagcctcgg tgatgtacac ggtggtcact ccc (SEQ ID NO:66).

OR47

45 LOCUS AF127860 644 bp DNA PRI 28-FEB-2000
 DEFINITION *Eulemur rubriventer* ERU66 pseudogene, partial sequence.
 ACCESSION AF127860
 KEYWORDS .
 SOURCE *Eulemur rubriventer*.
 50 ORGANISM *Eulemur rubriventer*
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; *Eulemur*.
 REFERENCE 1 (bases 1 to 644)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 644)
 5 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 10 FEATURES Location/Qualifiers
 source 1..644
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>644
 /gene="ERU66"
 15 /pseudo
 BASE COUNT 113 a 191 c 145 g 195 t
 ORIGIN
 1 cttttctgac atctgtttca cttccgccac catcccaaag atgctgtgga gcatccgggc
 61 acagagcaaa tccatcaccc gtgccggctg cctcacacag atgtactgtt tcatggcttt
 20 121 tggactctg gacaatctga tgctgatggt catggcttat gaccactttg tgcccatctg
 181 tcaccctctg cactacacag tcatcatgaa cccagtgtc ttgttccagg tgcttgcga
 241 caccgggctt gtcagcatcc tgggggcctt cctcggagag tgaccgtgtt gcggcttctt
 301 ttggtgcagt cactgaaatc ccacactatt tctgtgagct cctgaggct ctccagctct
 361 cccactctga cccctccatc aataatgtca tattatacat tgtgacgggt tcatgggctt
 25 421 ctttctctt gctgagattc ttttctcta ttctcaact gtttttctg tcttgaggat
 481 ctcaacagca ggggggaagt ataaagtgtt ttctctctgt gagtctcacc tctcggtgt
 541 ctgcctgttc tgtgggacct gcctggggtc tagctcagtt ccacatggac acacgttct
 601 ccgacagggg tgttgctctg gtcccatata ctgtagtcac cccc (SEQ ID NO:67).

OR48

LOCUS AF127861 649 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur rubriventer olfactory receptor (ERU67) gene, partial cds.
 ACCESSION AF127861
 35 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 40 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 45 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 50 FEATURES Location/Qualifiers
 source 1..649
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>649


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/feature="CDS" /gene="ERU67"
<1..>649
/feature="CDS" /gene="ERU67"
/codon_start=2
5 /product="olfactory receptor"
/translation="FMDICFTTVIVPKMLVNFLSETKAISYVGCLVQMYFFMALANTD
SYLLASMAIDRLVAICKPFHYDVVMSPRRCLLMLLGSC TISHLHSLFRVLLMSRLSFC
ASHIIKHFFCDTQPVLKLSGSDTSSSQIVVMTETLAVIVTPFLCIIFS YLRIITVLA
IPSAAGKWKAFTSCGSHLTVVVLFGSVIYVYFRPLSMYSVMKDRVATVMYTVVTP" (SEQ
10 ID NO:68).

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BASE COUNT 119 a 200 c 141 g 189 t
ORIGIN

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1 ttcatggat atctgctca caacagtcac tgtgcccaag atgctgggtga atttctgtc
61 agagacaaag gccatctct atgtgggctg tctgtccag atgtacttct tcatggccct
15 121 tgcaaacact gacagctacc tactggcctc catggctatt gaccggctgg tggccatctg
181 caaacccctc cactatgatg tggttatgag cccacggcgt tgccctctca tctgttggg
241 ttctgcacc atctccacc tacactccct gtccgggtg ctactcatgt ctgcctgtc
301 ttctgtgcc tccacatca ttaagcactt ttctgtgat acccagctg tgctaaagct
361 ttctgtctg gacacatct ccagccagat tgtgtcatg accgagacc tggtgtcat
20 421 cgtgacccc ttctgtgca tcattcttc ctatctgaga atcatcatca ctgtgtctgc
481 aatccctct gcagccgga agtgaaggc cttctccacc tgtgtctcc acctcactg
541 ggtgtctg ttctatgga gtgtcatcta tgtgtattc aggccctgt ccatgtactc
601 agtgatgaag gaccgggtg ccacagtat gtacacgta gtacacct (SEQ ID NO:69).

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OR49

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LOCUS AF127862 649 bp DNA PRI 28-FEB-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU83) gene, partial cds.
ACCESSION AF127862
30 KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.
35 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
40 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
45 FEATURES Location/Qualifiers
source 1..649
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>649
50 /gene="EFU83"
CDS <1..>649
/gene="EFU83"
/codon_start=2
/product="olfactory receptor"

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/translation="FSDICLVSTTVPQMLVNVQTHSKVISYAGCVTQMDFFVLFVGLD
SFLLTVMAYDRFVVICHPLHYAVTMNPRLCGLLVLLSWIMSALSSLLESVVWVVCFC
LDLEIPHFCELENEIHLACSDTFLIDMVMYFSALLGGGSLAGILYSYSKIVSSVRA
ISSAQGKYKAFSTCASHLAVVSLFYCTSLGVYLSSAATHNSHSSATASVMYTVVTP" (SEQ ID

NO:70).

BASE COUNT 119 a 182 c 152 g 196 t

ORIGIN

1 cttttctgac atctgcttgg tctcgaccac tgtccacag atgctggtga atgtgcagac
61 acacagcaaa gtcatacct acgcaggctg cgtcaccag atggacttct ttgtactctt
121 tgtagggctg gacagcttcc tcttaccgt gatggcctat gaccggtttg tggctatctg
181 ccaccactg cactacgagg tcaccatgaa cccagggctc tgggggctgc tgggtctgct
241 gtcttgatc atgagtgccc tgagttcctt gtagaaagc ttagtggtgc tgggggtg
301 ctctgtctg gacttggaat tccccactt ttctgtgaa cttatgaga taatccact
361 ggcctgttct gacaccttc ttattgacat ggtgatgat ttctcagctc tactgtggg
421 tgggtgttcc ctggctggga tctttactc ttactctaag atagtttct cgtacgtgc
481 aatctctca gctcagggga agtataaagc atttccacc tgtgcatctc acctcgggt
541 tgtctcccta ttttactgca caagctcgg ggtgtacttg agttctgtg ctacacaaa
601 ctacactcc agcgcaacag cctcgggtgat gtacacggtg gtcactccc (SEQ ID NO:71).

OR50

LOCUS AF127863 642 bp DNA PRI 28-FEB-2000

DEFINITION Eulemur rubriventer EFU84 pseudogene, partial sequence.

ACCESSION AF127863

KEYWORDS .

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.

REFERENCE 1 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 642)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..642

/organism="Eulemur rubriventer"

/db_xref="taxon:34829"

gene <1..>642

/gene="EFU84"

/pseudo

BASE COUNT 130 a 180 c 138 g 194 t

ORIGIN

1 cttttagac atctgttttg tcttaccat ggtcccaaag atgctggtga acatcaagac
61 acacagcagt catatcctat gcaggctgtg tcaccagat gcacttttcc ataactttg
121 cagagttaga catcttctc ctgacgggtg tggcctatga ccgggtgtg gccatctgtc
181 acccctgca ctacacggcc atcatgaacc ccaggctctg tgaactgtg gttctggctt
241 cctggatcat aagtggccc aattcctgt taaaaagtgt aaagggtctg tggctgtcct
301 tctgtacaaa ctggaaatc cgtcactttt tctgtgaact tagatactac atcttgctctg

361 ttgtgacacc tctgttcacg acgtggtgat acatattgca gctgtggtgc tggtgtttt
 421 tctcttctgct gggatccttt actcttactc tcagatagtt tctccacac gtgcactctc
 481 ctcagctcag gcgaagtga aagcatttc cacctgtgca gtcacctcg cgggtgtctc
 541 tctattttac tgcacaagcc tcgggggtga cttgagctct gctgtctacac acaaccaca
 601 ctccagcgca acagcctcgg tgatgtacat ggtggtcact cc (SEQ ID NO:72).

OR51

LOCUS AF127864 652 bp DNA PRI 28-FEB-2000
 10 DEFINITION Eulemur fulvus EFU86 pseudogene, partial sequence.
 ACCESSION AF127864
 KEYWORDS .
 SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 20 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 652)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 25 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..652
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 30 gene <1..>652
 /gene="EFU86"
 /pseudo
 BASE COUNT 126 a 166 c 152 g 208 t
 35 ORIGIN
 1 ctttcagac atctgtttg gttccaccac tgtcccaaag atgctggtga atgtgcagac
 61 acagagcaaa gtcatactct acgcaggctg cgtcaccag atggactttt tcatactctt
 121 tgcagggttg gatacttta tgctgatcat gatggcctat gaccggtttg gggccatctg
 181 tcaccactg cagtacacgg tcatcatgaa cccaggctc tgtgggctgc tggttgtggt
 40 241 gcctggatc ttgagtacc tgaattcctt gttacaaagc ttaatggtgt tgcactgtc
 301 cttttgtaga cacttggaag tctcacttt ttctgtgaac ttaatcaggt tgtccacctt
 361 gcctgttctg aaaccttctt taatgacatg gtgatgtatc tgatatctgt ggtgctgggt
 421 ggtggttccc tggctgggac tctttattct ttcttactgc agaatagttt gctccatacg
 481 tgcaacgtcc tcagctcagg ggaagtataa agcatttccc acctgtgcat ctacactctc
 45 541 agttgtctcc ttacttct gcacaatctc aggggtgtac ctcagctctg ctgctaccca
 601 gaattcgtgc tccagtgcag tagccttggt ggtgtacacg gtggtcactc cc (SEQ ID NO:73).

OR52

50 LOCUS AF127865 649 bp DNA PRI 28-FEB-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU87) gene, partial cds.
 ACCESSION AF127865
 KEYWORDS .
 SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 649)

5 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

10 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

15 source 1..649

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>649

/gene="EFU87"

20 CDS <1..>649

/gene="EFU87"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFTSTTIPKMLVNIETHSKDISYMGCLTQMYFFMIFAGLD

25 NFLLTVMAYDRFVAICHPLHYTVIMSPRFCALLVLISWFIMTLVALVHVLLILRLTFS

LETEIPHFCDLAQILEVAHSDTLINNICYMLSTVLLGVFPVTGILFSYSKIVSSLMR

MSSTAGKKKAFSTCGSHLSVVCFLFCGTGVGVYLSSAVTPSSQSSSIASVMFTVVTP" (SEQ ID

NO:74).

BASE COUNT 125 a 187 c 134 g 203 t

30 ORIGIN

1 cttgttgac atctgtttca cctccaccac catccccaag atgctggtga acattgaaac

61 acacagcaaa gacatctct acatgggatg cctcactcag atgtatttt tcatgattt

121 tgctggactg gataatttcc tctgactgt gatgcctat gaccggttg tggccatctg

35 181 ccacccctta cactacacgg tcatcatgag tccccgcttc tgtgccctcc tggttctcat

241 atcttggttc atcatgacc tggttgccct ggttcagtga ctactgatat tgaggctgac

301 cttctcttta gaaactgaaa tcccacattt ctctgtgac ctggctcaga ttctcgaggt

361 ggcccactct gataccctca tcaataacat ctgcatgtac ttgtcgactg tgttctctggg

421 cgtgtttcct gtcacgggga tctcttctc ctactctaaa attgtctct ccttaatgag

481 gatgtcctcc actgcaggca agaagaaagc atttccacc tgtgggtctc acctctctgt

40 541 ggtctgcttg ttctcggaag caggagtgg ggtctatctc agttctctg tgacccttc

601 ttccagagc agcagcattg cctcagtgt gttcacggtg gtcaccccc (SEQ ID NO:75).

OR53

45 LOCUS AF127866 646 bp DNA PRI 28-FEB-2000

DEFINITION Macaca sylvanus MSY1 pseudogene, partial sequence.

ACCESSION AF127866

KEYWORDS .

SOURCE Barbary ape.

50 ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Macaca.

REFERENCE 1 (bases 1 to 646)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 5 REFERENCE 2 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 10 FEATURES Location/Qualifiers
 source 1..646
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>646
 15 /gene="MSY1"
 /pseudo
 BASE COUNT 115 a 186 c 144 g 201 t
 ORIGIN

1 cttgttgac atctgttta tctccaccac cgtccccagg atgctgatga acatccaggc
 20 61 atggagcaaa gacatctcct acgtgggggtg cctcactcag gtgtattttt taatgatgtt
 121 tgttggaatg gatactttcc tactggccat gatggcctat gaccggtttg tggccatctg
 181 ccacccctg cactacacgg tcatcatgaa cccctgcctc tgtggcctcc tggttctggc
 241 atcttgattc atcattttat gggctcctct agttcatait ctactgatga agagtttgat
 301 ctccataggc actgagattc cgcatcttct ctgtgaactg gctcagggtcc tcaagggtggc
 25 361 ccgtctgat actctcctcg ttaacattgt ctgtatgtg gccacagcac tgctgggtgt
 421 gcttcctgta gctggggtcc tcttctccta ctctcagatc gtctcctct taatgaggat
 481 gtctccacc gagggcaagt gcaaagcctt tccacctgt gggctcacc tctgtgtggt
 541 ctcttggttc tatggaacag gacttgggtt ctatctcagt tctgtgtga cccattctc
 601 ccagagcagc tccatggcct cagtgtatga cccatggtc accccc (SEQ ID NO:76).

OR54

LOCUS AF127867 649 bp DNA PRI 28-FEB-2000
 DEFINITION Macaca sylvanus olfactory receptor (MSY12) gene, partial cds.
 35 ACCESSION AF127867
 KEYWORDS .
 SOURCE Barbary ape.
 ORGANISM Macaca sylvanus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 40 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 45 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 50 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Macaca sylvanus"

/db_xref="taxon:9546"
 gene <1..>649
 /gene="MSY12"
 CDS <1..>649
 /gene="MSY12"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDVCFVSTTVPKMLVNIQTQNKVITYAGCISQMCFFIFFAGLD
 IFMLTVMAYDRFVAICHPLHYVTMNPRLCGLLVLASWIMSALNSSLQSLMVLHLSFC
 ADLEIPHFCELNQVIHLTCSDTFLNDMVMYLSAVLLGGGCLIGILYSYSKIVSSIHA
 ISSVQGGKYKAFSTCASHLSVVSFLFYCTILGVYLSSAATHSSHASAAVSVMYTVVTP" (SEQ ID

NO:77).

BASE COUNT 132 a 173 c 138 g 206 t

ORIGIN

1 cttcgtagac gtctgttttg tgtccaccac tgtcccgaag atgctggtga acatccagac
 61 acagaacaaa gtcacacact atgcaggctg catcagccag atgtgctttt tcataattctt
 121 tgcaggattg gacactctta tgetgaccgt gatggcctac gacaggtttg tggccatctg
 181 tcacccccctg cactacacgg tcacatgaa ccccaggctc tgtggactgc tggttctggc
 241 gtctgtgac atgagtggcc tgaattcttc attgcaaagc ttaatggat tgcaccttcc
 301 cttctgtgca gacttggaat tccccactt ttctgtgaa cttaatcagg tcatccacct
 361 tacctgttct gacacttttc ttaatgacat ggtgatgtat ttgtcagctg tgcgtctggg
 421 tgggggatgt ctcattggga tcctttactc ttactctaag atcgtctcct ctatacatgc
 481 aatctcatca gttcaggggga agtacaaggc atttccacc tgtgcatctc acctctcggt
 541 tgtctcctta ttatttgta caatcttagg tgtgtacctt agttctgctg caaccacag
 601 ctacacgca agtgctgcag tctcggtgat gtacactgtg gttaccccc (SEQ ID NO:78).

OR55

LOCUS AF127868 649 bp DNA PRI 28-FEB-2000
 DEFINITION *Macaca sylvanus* olfactory receptor (MSY16) gene, partial cds.
 ACCESSION AF127868
 KEYWORDS .

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>649

/gene="MSY16"

CDS <1..>649

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/gene="MSY16"  
/codon_start=2  
/product="olfactory receptor"  
/translation="LADIGFTSTTPVKMLVNIQAQSN AISYAGCISQMYFFMVFGGID  
TFLLTVMAYDRYVAICHPLYYPVIMNPRLCGLLVLSWFLSLSYSLIQSLLMLQLSFC  
TSWVIQHFYCELAQALTLACSDTHINYILLYVVTGLLGFVPFSGILFSYQTQIVSSILR  
ISSTDGKHKAFSNCGSHLSVVFLFYGTGLGVYLLSSNASSSSWRGMVASVMYTVVTP" (SEQ ID
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NO:79).

ORIGIN

1 cttggtgac atcggttca cctccaccac agtcccaag atgctggtga acatccaggc
61 gcagagcaat gccatcagct atgcaggctg catctcccag atgtatttt tcatggtttt
121 tggaggcata gacacatttc tctcaccgt gatggcctat gaccggtatg tggccatctg
181 tcacccccctg tactaccctg tcattatgaa cccccgcctc tgtggcctgc tegtctctgt
241 gtccctggttc ctacgttgtt catactccct gatccagagt ctgttgatgc tgcagttgtc
301 ctttgcacc agttgggtca ttacgacctt tactgcgag ctgtctcagg ccttcacgct
361 tgcctgctca gacacacaca tcaattacat cctgctctac gtggtgaccg gccctctggg
421 ttttgtccc ttctcaggaa tctttttc ctacacccaa attgtctctt ccatctcag
481 aatctcatcc acagatggga aacacaaagc ctttctaac tgcggatctc atctgtctg
541 ggttttttta ttctatggga caggcctgg tgtgtatctt agttccaatg catcgtcctc
601 ttctctggcg ggcatsgtgg cctcggtcat gtacactgtg gtcaccccc (SEQ ID NO:80).

OR56

LOCUS AF127869 647 bp DNA PRI 28-FEB-2000

DEFINITION *Macaca sylvanus* MSY2 pseudogene, partial sequence.

ACCESSION AF127869

KEYWORDS .

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 647)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 647)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES	Location/Qualifiers
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source      1..647
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Organism

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/organism="Macaca sylvanus"
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/db xref="taxon:9546"
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gene $\overline{<1..>647}$

/gene="MSY2"

/pseudo

BASE COUNT 131 a 173 c 137 g 206 t

ORIGIN

61 acagaacaaa gtcacacct atgcaggctg catcagccag atgtgctttt tcatatttt

121 tgcaggattg gacaccttta tgctgaccgt gatggcctac gacaggtttg tggccatctg
 181 tcaccctctg cactacacgg tcaccatgaa ccccaggctc tgtggactgc tggttctggc
 241 gtcctgatca tgagtgcctt gaattcttca ttgcaaagct taatgtatt gcaccttcc
 301 ttctgtgcag acttggaat tccccacttt ttctgtgaac ttaatcagggt catccacct
 5 361 acctgttctg acacttttct taatgacatg gtgatgtatt tgctagctgt gctgctgggt
 421 gggggatgtc tcattgggat cctttactct tactctaaga tcgtctctc tatacttga
 481 atctcatcag ttcaggggaa gtacaaggca tttccacct gtgcattca cctctcggt
 541 gtctccttat ttattgtaca atctagggtg tgtaccttag ttctgctga acccacagct
 601 cacacgaag tgctgcagtc tcggatgatg acactgtggt taccccc (SEQ ID NO:81).

OR57

LOCUS AF127870 649 bp DNA PRI 28-FEB-2000
 DEFINITION *Macaca sylvanus* olfactory receptor (MSY4) gene, partial cds.
 15 ACCESSION AF127870
 KEYWORDS .
 SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 20 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 25 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

30 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

35 gene <1..>649

/gene="MSY4"

CDS <1..>649

/gene="MSY4"

40 /codon_start=2

/product="olfactory receptor"

/translation="FIDICFVSTTVPKMMVNIQTQSRVITYAGCITQMCFFIFFVGLD

IFMLTVMAFDRFVAICHPLHYTVTMNPRLSGLLVLASWIMSALNSSLQSLIVLRLSFC

45 TDLEIPHFFCELNQVVHLACSDTFLNDMVMYLASALLGCGPLSGILYSYSKIVSSIRG

ISSAQGKYRAFSTCASHLSVVSFLFYGTLLGVYFSSAATRNSHSSAAASVMYTVVTP" (SEQ ID

NO:82).

BASE COUNT 125 a 179 c 142 g 203 t

ORIGIN

1 cttcatagac atctgttttg tgtccaccac tgtcccgaag atgatgtgta acatccagac
 50 61 acagagcaga gtcacacct atgcaggctg catcaccag atgtgctttt tcatactt
 121 tgtgggactg gatacttta tgctgaccgt gatggccttt gaccggttg tggccatctg
 181 tcacccctg cactacacgg tcaccatgaa ccccaggctc agtgggctgc tggttctggc
 241 gtcctggatc atgagtccc tgaattctc gttacaaagc ttaatagtc tgcggtttc
 301 cttctgaca gacttgaaa tccccactt ttctgtgaa cttaatcagg tggccacct

361 tgcctgttct gacaccttc ttaatgacat ggtgatgtat ttggcatctg cactgctggg
 421 ctgtggctccc ctctctggga tctttattc ttattctaag atcgtttct ccatacgtgg
 481 aatctcatca gctcagggga agtacagggc atttccacc tgtgcatctc acctctcagt
 541 tgtctcctta tttatgta cgctcctagg agtgtacttt agttctgctg caacccgtaa
 5 601 ctcacactca agtgctgcag cctcgggtgat gtacaccgtg gttaccccc (SEQ ID NO:83).

OR58

LOCUS AF127871 646 bp DNA PRI 28-FEB-2000
 10 DEFINITION *Macaca sylvanus* olfactory receptor (MSY6) gene, partial cds.
 ACCESSION AF127871
 KEYWORDS .
 SOURCE Barbary ape.
 ORGANISM *Macaca sylvanus*
 15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.
 REFERENCE 1 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..646
 30 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>646
 /gene="MSY6"
 CDS <1..>646
 35 /gene="MSY6"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDLFFVTNTIPKMLVNLQSQNKAI SYAGCLTQLYFLVSLVALD
 NLILAVMAYDRYVAICCP LHYTTAMSPKLCILL LSLCWVLSVLYGLIHTFLMTTVTFC
 40 GSRKIH YIFCEMYVLLRLACSDTQINH TVLIATGCFIFLIPFGFMIISYVLIVRAILR
 IPSVSKKYKAFSTCASHLG VVSLFYGTLRMVYLKPLHTYSVKDSVATVMYAVVTP" (SEQ ID
 NO:84).
 BASE COUNT 134 a 196 c 126 g 190 t
 ORIGIN
 45 1 cttcactgac ctctctttg tcaccaacac aatccccaag atgctggtga acctccagtc
 61 ccagaacaaa gccatctct atgcagggtg tctgacacag ctctacttcc tggctcctt
 121 ggtggccctg gacaacctca tcttggtgt gatggcgat gaccgctatg tggccatctg
 181 ctgccccctc cactacacca cagccatgag ccctaagctc tgtatcttac tctttcctt
 241 gtgttgggtc ttatctgtgc tctatggcct catacacacc ttctcatga ccacggtgac
 50 301 cttctgtggg tcacgaaaaa tccactacat cttctgtgag atgtatgtat tctgaggct
 361 ggcatgttcc gacactcaga ttaacacac agtgcgtgatt gccacaggct gctttatctt
 421 cctcattccc ttgtgattca tgatcattc ctatgtgtg attgtcagag ccatacctcag
 481 aataacctca gtctctaaga aatacaaagc cttctccact tgtgcctccc atttgggtgt
 541 agtctccctc ttctatggga cacttctgat ggtatacctg aagccctcc atacttactc

601 tgtgaaggac tcagtagcca cagtgatgta tgcggtggtg acaccc (SEQ ID NO:85).

OR59

5 LOCUS AF127872 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY7) gene, partial cds.
ACCESSION AF127872
KEYWORDS .
SOURCE Barbary ape.
10 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>649
/gene="MSY7"
30 CDS <1..>649
/gene="MSY7"
/codon_start=2
/product="olfactory receptor"
/translation="WVDICFSICIIPKMLVNIQTKNKTISYMDCLTQVYFSMFFPILD
35 TLLLTVMAYDRFVA VCHPLHYVTIMNPRCLGLLVFVTWLIGVMTPLLHISLLTHLTFC
KDFEIPHFCELTHILQLACSDTFLNSTLIYVMTGVLGVFPLLGIIFSYSRIASSIRK
MSSSGGKEKALSTCGSHLSIVSLFYGTGIGVHFTSAVTHSSQNISVASVMYTVVTP" (SEQ ID
NO:86).
BASE COUNT 129 a 190 c 127 g 203 t
40 ORIGIN
1 ctgggtgac atctgttca gcatctgcat catccccaag atgctggtga acatccagac
61 caagaacaaa accatctctt acatggactg cctcaccag gtctatttct ccatgtttt
121 tcctattctg gacacgctac tctgaccgt gatggcttat gaccggttg tggccgctctg
181 ccacccctg cactatgtaa ccatcatgaa ccccgccctc tgcggcctcc tggttttgt
45 241 cagtggtctc attggtgtca tgacacect cctccatatt tctctgtga cgcactaac
301 ctctgtaaa gattttgaaa ttccacattt ttctgcgaa ctgacacaca tctccagct
361 ggctgctct gatacttcc tgaacagcac gttgatatat gttatgacag gtgtgctggg
421 cgttttccc ctcttgga tcatttctc ttattcaga atcgcttcat ccaaaaggaa
481 gatgtctca tctgggggaa aagagaaagc actttctacc tgtggctctc acctctccat
50 541 cgtttctta tttatggga caggcattgg ggtccattc acttctgcgg tgactcattc
601 ttccagaac atctccgtg cctcgtgat gtacacggtg gttaccccc (SEQ ID NO:87).

OR60

LOCUS AF127873 645 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus MSY8 pseudogene, partial sequence.
5 ACCESSION AF127873
KEYWORDS .
SOURCE Barbary ape.
ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
15 reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 645)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..645
/organism="Macaca sylvanus"
25 /db_xref="taxon:9546"
gene <1..>645
/gene="MSY8"
/pseudo
BASE COUNT 117 a 185 c 142 g 201 t
30 ORIGIN
1 cttgttgac atctgttta tctccaccac cgtccccagg atgctgatga acatccaggc
61 atggagcaaa gacatctcct acgtgggggtg cctcactcag gtgtattttt taatgatgtt
121 tgctggaatg gatactttcc tactggccat gatggcctat gaccgggttg tggccatctg
181 ccacccctg cactacacgg tcatcatgaa ccctgcctc tgggcatcc tggttctggc
35 241 atcttgatc atcattttat gggtctcct agttcatatt ctactgatga agagttgat
301 ctcatagagc actgagattc cgcatttctt ctgtgaactg gctcaggtec tcaagggtgcc
361 cgtctgata ctctctcgt taacattgtc ttgtatgtgg ccacagcact gctgggtgtg
421 ctctctgtag ctgggatact ctctcctac tctcagatcg tctctcctt aatgaggatg
481 tcctccacg agggcaagta caaagcctt tccacctgtg ggtctacct ctgtgtggtc
40 541 tcctgtttct atggaacagg acttggggtc tatctcagtt ctgctgtgac ccattcttcc
601 cagagcagct ccatggcctc agtgatgtac accatggta ccccc (SEQ ID NO:88).

OR61

45 LOCUS AF127874 649 bp DNA PRI 28-FEB-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY9) gene, partial cds.
ACCESSION AF127874
KEYWORDS .
SOURCE Barbary ape.
50 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 5 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 10 FEATURES Location/Qualifiers
 source 1..649
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>649
 15 /gene="MSY9"
 CDS <1..>649
 /gene="MSY9"
 /codon_start=2
 /product="olfactory receptor"
 20 /translation="LADIGFTSTTPVKMLVNIQAQSN AISYAGCISQMYFFMVFGGID
 TFLLTVMAYDRYVAICHPLYYPVIMNPRLCGLLVLSWFLSLSYSLIQSLMLQLSFC
 TSWVIQHFYCELAQALTLACSDTHINYILLYVVVTGLLGFVPFSGILFSYTOIVSSILR
 ISSTDGKHKAFSTCGSHLSVVFLFYGTGLGVYLSSNASSSSWRGMVASVMYTVVTP" (SEQ ID
 NO:89).
 25 BASE COUNT 114 a 196 c 140 g 199 t
 ORIGIN
 1 ctggctgac atcggttca cctccaccac agtccccaag atgctggtga acatccaggc
 61 gcagagcaat gccatcagct atgcaggctg catctcccag atgtatttt tcatggttt
 121 tggaggcata gacacatttc tcctaccgt gatggcctat gaccggtatg tggccatctg
 30 181 tcacccctg tactaccctg tcattatgaa cccccgcctc tgggcctgc tggttctgt
 241 gtctggttc ctacgctgt catactcct gatccagagt ctgtgatgc tgcagttgc
 301 ctttgcacc agttgggtca ttacgactt ttactgcgag ctgtctcagg ccctcacgt
 361 tgctgctca gacacacaca tcaattacat cctgctctac gtggtgaccg gccttctggg
 421 tttgtgccc ttctcaggaa tcctttctc ctacaccaa attgtctct ccatcctgag
 35 481 aatctcatcc acagatggga aacacaaagc cttttctacc tgcgcatctc atctgtctgt
 541 ggtttttta ttctatggga caggccttg tgtgtatct agtccaatg catcgtcctc
 601 ttctggcgg ggcatggtgg cctcggtcat gtacactgtg gtcaccccc (SEQ ID NO:90).

OR62

40 LOCUS AF127875 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA21) gene, partial cds.
 ACCESSION AF127875
 KEYWORDS .
 45 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 649)
 50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>649

/gene="CJA21"

CDS <1..>649

/gene="CJA21"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICVTSTTLPKTLSNIQTHSKVITYAGCVTQLYFFVLFIGLD

SLLPTVMAYDRFVAICHPLHYTVIMNPQFCGLLVLSWIMSALHSLTESLMVYPLLFC

TDLKIPQFFCEIHQIIQFACSDTFLNNLVMYLSTVLLGGGPLAGILYSYSKIASSIRA

ISSAEGKYKAFSTCASHLSVVSIFYCTGLGVYLSAATHSSLSSAAASVMYTVVTP" (SEQ ID

NO:91).

BASE COUNT 137 a 184 c 133 g 195 t

ORIGIN

1 cttgtggac atctgtgta cctccaccac acttccgaag acactgtcaa acatccagac

61 acacagcaaa gtcacacact atgcaggctg cgtcaccagc ttgtactctt ttgtactctt

121 catagggttg gacagcttac tcccagaccg gatggcctat gaccgggttg tggccatctg

181 tcaccccttg cactacacgg tcacatgaa ccctcagttc tgtggactgc tggttctggt

241 gtcttgatc atgagtgcgc tgcattctt gacagaaagc ttaatggtat acccactgct

301 ctttgtaca gactgaaaa tccccagtt ttctgtgaa atcatcaga taattcaatt

361 tgctgttct gacaccttc taataacct ggtgatgat ttgtcaactg tgctcctggg

421 cggtggtccc ctgctggga tctgtactc ttactctaag atagcttct ctatacgtgc

481 aatcctatca gctgagggga agtacaaggc atttccacc tgtgcatctc acctctcagt

541 tgtctcctta ttatttgta caggcctagg ggtgtacctg agttctgctg caaccacag

601 ctcacttca agcgcagcag cctcggtgat gtacacagtg gtcaccccc (SEQ ID NO:92).

OR63

LOCUS AF127876 649 bp DNA PRI 28-FEB-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA22) gene, partial cds.

ACCESSION AF127876

KEYWORDS

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 5 gene <1..>649
 /gene="CJA22"
 CDS <1..>649
 /gene="CJA22"
 /codon_start=2
 /product="olfactory receptor"
 10 /translation="LVDICFTSTTPKILVNIQE QSGTISYAGCIAQMYFFMVFGGMD
 TFLLTVMAYDRYVAICHPLSYPIVNPRLCGLLVLSWFLSLSYSLLQSLMLRLSFC
 TSWVIQHFYCELAQVLTACSDTHVNYILLYMVTGLLGCVPFSGILFSYIQIVSSILR
 IPSTDGKHKAFTSCGSHLSVVSIFYGTGLGVYLSSNASSSSWWGMVASAMYTVVTP" (SEQ ID

NO:93).

15 BASE COUNT 112 a 193 c 140 g 204 t

ORIGIN

1 cttggttgac atctgtttca cctccaccac agtccccaag attctggtga acatccagga
 61 gcagagtggg accatcagct atgcaggctg cattgcccag atgtatttt tcatggtttt
 121 tggaggcatg gacacatttc tctcactgt gatggcctat gaccggtatg tggctatctg
 20 181 tcacccctg tctaccctg tcattgtaa cccccgctc tgcggcctgt tggttctgt
 241 gtctggttc ctcagctgt catactcct gatccagagt ctgtgatgc tgcggctatc
 301 cttctgcacc agtgggtca ttcagcactt ttactgtgag ctgtctagg ttctcacgt
 361 tgcctgctca gacacacatg tcaattacat cctgctctac atggtgaccg gccttctggg
 421 ctgtgtccc ttctcaggga tcttttctc ctacatccaa attgtctcct ccatcctgag
 25 481 aatcccatcc acagatggga aacataaagc cttttctacc tgtggatctc atctgtctgt
 541 gggttttta ttctacggga caggccttgg tgtctacct agtccaatg cctcgtctc
 601 ttctgtgtgg ggcaggtgg cctcagccat gtacacagt gtcaccct (SEQ ID NO:94).

OR64

30 LOCUS AF127877 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA23) gene, partial cds.

ACCESSION AF127877

KEYWORDS .

35 SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

40 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

45 AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

50 source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>649
 /gene="CJA23"

CDS <1..>649
 /gene="CJA23"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDICFTTVIVPRMLVNFLSGTKVIPYMGCLVQMYFFMAFGNTD
 SYLLASMAIDRLVAICNPLHYDVAMNPRHCLLMLLGSCSISHLHSLFRVLLMSHLSFC
 ASHVIKHFFCDTQPVLKLSCSDTSSSQMVVMTETLAVIVTPFLCIHFSYLRIITVLR
 IPFAAGKWRAFSTCGSHLTVVALFYGSIYYVYFRPLSMYSVVKDRVATVMYTVVTP" (SEQ ID

NO:95).

BASE COUNT 126 a 192 c 139 g 192 t
 ORIGIN

1 ttccaggat atctgctca caacagtcag agtgcccagg atgctggtga atttctatc
 61 agggacaaag gttatccct acatgggctg cctggtccaa atgtacttct tcatggcctt
 121 tgggaacact gacagctacc tgctggcctc tatggccatc gaccggctgg tggccatctg
 181 caaccctta cactatgatg tggctatgaa cccccggcat tgcctactca tgctattggg
 241 ttctgtagc atctcccacc tacattcct gtccgggtg ctacttatgt ctacactgtc
 301 ttctgtgcc tcccagctca ttaagcactt ttctgtgac acccagcctg tgctaaagct
 361 gtctgctct gacagtcct ccagccagat ggtggtcatg actgagactt tagctgtcat
 421 tgtgacccc ttctgtgta tcattcttc ctactgcga atcatcatca ctgtgctcag
 481 aatccccctt gcagctggga agtggagggc ctctctacc tgtggtccc acctactgt
 541 agtagccctt tctacggga gtatatatta tctctatctt aggccctgt ccatgtactc
 601 agtgggaag gaccgagtag ccacagttat gtacacagta gtgacaccc (SEQ ID NO:96).

OR65

LOCUS AF127878 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA24) gene, partial cds.
 ACCESSION AF127878
 KEYWORDS .
 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>649
 /gene="CJA24"
 CDS <1..>649
 /gene="CJA24"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAVLD

VFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
 TDLEIPHFFCELNQVIHLACSDTFLNDVVMYLA AVLGGGPLAGILYSYSKIVSSIRA
 ISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP" (SEQ ID

NO:97).

5 BASE COUNT 136 a 177 c 134 g 202 t

ORIGIN

1 cttttagac atctgtttg tgtctaccac tgtcccaaag atgtggtaa atatccagac
 61 acacagcaaa gtcacacct ttgcaggctg catcaccag ataggccatt gcctactctt
 121 tgcagtattg gacgtcttta tgtctactgt gatggcctat gaccggtatg tggccatctg
 10 181 tcaccactg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc
 241 atcctggatc ctgagtgcc tgaattctc attacaacc ttaatagtgc tgcggcttgc
 301 cttctgcaca gacttggaaa tccccactt ttctgcgaa ctaatacagg tcatccacct
 361 tgcctgttct gacactttc ttaatgatgt ggtgatgtat ttggccgctg tgctgctggg
 421 ggggtggccc ctgcaggga ttcttactc ttactctaag atagtctc ccatcgtgc
 15 481 aatctcatca gtcaggga agtacaaggc atttccacc tgtgtatctc acatctaat
 541 tgtctccta tttatgga cactcctagg tgtgtacctt agttctgctg caactggcaa
 601 ctcacattca agagctgcag cctcgggtat gtacactgtg gtcaccccc (SEQ ID NO:98).

OR66

20

LOCUS AF127879 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA25) gene, partial cds.
 ACCESSION AF127879
 KEYWORDS .

25

SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

30

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

35

REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

40

FEATURES Location/Qualifiers
 source 1..649
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"

45

gene <1..>649
 /gene="CJA25"
 CDS <1..>649
 /gene="CJA25"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADICFTSTTVPKMLVDIQTQSKMITFAGCLTQIFFFVAFGCLD
 50 NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLGWCISVMVSLLETLTILRLSFC
 TNMEIPHFFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR
 VSPAQQQHKAFTSCGSHLSVVTLFYGTGLGVYLSLAATPSSRTSLMASVMYTMVTP" (SEQ ID

NO:99).

BASE COUNT 130 a 183 c 136 g 200 t

ORIGIN

```

1 ctttctgac atctgttca catccacgac cgtcccaaag atgctggtgg atatccaaac
61 acaaagcaaa atgatactt ttgcagggtg cctcaccag attttttt tcgttcatt
121 tggatgctg gacaattgc tctgaccgt gatggcctat gaccgggtcg tggccatctg
181 tcacccctg cactacgcgg tcacatgaa cccccggctc ttagactgc tagttctggg
241 gtctggtgc atcagtgtca tggtttctc gctcgagacc ttgacattt tgaggctgc
301 cttctgcaca aacatggaaa tcccacactt ttttgtgat gttctgaag tcctgaagct
361 cgctgttct gaaacctcg tcaataaaat cgtgatgtat ttttgacaa ttgcaatggg
421 tgttttctc ctctctgaa tcctatactc ttattctcag attttctcct ccactctgag
481 agtatcacct gccaaggcc agcacaagc ctttccacc tgggggtc acctctcagt
541 ggtcacctg ttcatggca cgggccttg ggtatatc agtcttcag ctacaccatc
601 tttaggaca agtctgatg cctcgtgat gtacacatg gtcacccc (SEQ ID NO:100).
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OR67

```

LOCUS AF127880 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA26) gene, partial cds.
ACCESSION AF127880
KEYWORDS .
SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA26"
CDS <1..>649
/gene="CJA26"
/codon_start=2
/product="olfactory receptor"
/translation="LADIGLTSTTVPRITVNIQTHSRVIAYASCLTQMSFSIFFVCME
DMLLAVMAYDRFVAICHPLHYPVIMSPRLCGFLVLVSAFLSLLISQVHNLIVLQFSCF
KDIKISNFFCDPSQLLTLACSDTFVNNIVMNFFAAVFGFLPISGIFLSYYKIVSSIL
RVPSSSGKYKAFSTCSSHLAVVCLFYGTVLGVYLGSSVSSPRKRVVTSVMYTVVTP" (SEQ ID
NO:101).
BASE COUNT 138 a 161 c 124 g 226 t
ORIGIN
1 cttggctgac attggttga cctccaccac cgtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atgcaagctg cctgacacag atgtctttt caatctttt
121 tgtgtgatg gaagacatgc tcctgtctgt gatggcctat gaccggttg tggccatctg
181 tcacccctg cactatccag tcacatgag cccacgactc tgggcttct tagtgttgg
```

241 gtctgctttt cttagccttt taatatccca ggtgcacaat ttgattgtct tacaatttc
 301 ttgcttcaaa gatataaaga ttctaattt ctctgtgac cttctcaac tectacact
 361 tgcttggtcc gacacgttg tcaataacaa catagtcag aatttcttg ctgctgtatt
 421 tggttttctt cccatctcag gcatctttt gtcttactat aaaattggt cctccattct
 5 481 gagagtcca tcataagtg ggaagtataa agccttctct acctgtagct ctcacctggc
 541 agttgttgct ttttttatg gaacagtcct tggaggtgac ctggggtcat cagtgtcatc
 601 cccaggaag agagtgtga cctcagtgat gtacacagt gtcactccc (SEQ ID NO:102).

OR68

LOCUS AF127881 649 bp DNA PRI 28-FEB-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA62) gene, partial cds.
 ACCESSION AF127881
 KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>649

/gene="CJA62"

CDS <1..>649

/gene="CJA62"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKTLVNIQTHSKVITFAGCITQIGHCLLFAVLD

VFMLTVMAYDRYVAICHPLHYTVINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC

TDLEIPHFVCVLNQVIHLACSDTFLNDVVMYLA AVLGGGPLAGILYSYSKIVSSIRA

ISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP" (SEQ ID

NO:103).

BASE COUNT 133 a 179 c 135 g 202 t

ORIGIN

1 cttttagac atctgtttg tgtctaccac tgtccgaag acgctggtaa atatccagac
 61 acacagcaaa gtcacacct ttgcaggctg catcaccag ataggccatt gcctctctt
 121 tgcagtattg gacgtcttta tctgactgt gatggcctat gaccggtatg tggccatctg
 181 tcaccactg cactacacag tcaccataa cccagactg tgtggactgc tggttctggc
 241 atcctggatc ctgagtgccc tgaattctc attacaacc ttaatagtgc tgcggcttc
 301 ctctgcaca gacttgaaa tccccactt tttctcgta ctaatcagg tcacccact
 361 tgctgttct gacactttc ttaatgatg ggtgatgtat ttggccgctg tgctgctggg
 421 ggggtgccc ctgcaggga ttcttactc ttactctaag atagtttct ccatagctgc
 481 aatctcatca gtcagggga agtacaaggc atttccacc tgtgtatctc acatcttaat

541 tgtctcctta ttttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agagctgcag cctcgggtgat gtacactgtg gtcaccccc (SEQ ID NO:104).

OR69

5 LOCUS AF127882 649 bp DNA PRI 28-FEB-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA80) gene, partial cds.
ACCESSION AF127882
KEYWORDS .
10 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
15 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
20 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..649
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>649
/gene="CJA80"
30 CDS <1..>649
/gene="CJA80"
/codon_start=2
/product="olfactory receptor"
/translation="FTDICFTTVIVPRMLVNFLSETKVISYMGCLVPMYFFMAFANTD
35 SYLLASMAIDRLVAICNPLHYDVAMNSRRCLLMLLGSCSISHLHSLFRVLLMSRLSFC
ASHVIKHFFCDTQPVLKLSGSDTSSSQMVVMTETLA VIVTPFLCIIFSYLRIITVLR
IPSAAGKWRAFSTCGSHLTVVALFYGSIYVYFRPLSMYSVVKDRVATVMYTVVTP" (SEQ ID
NO:105).
BASE COUNT 123 a 194 c 139 g 193 t
40 ORIGIN
1 ttccacggat atctgctca caacagtcac agtgcacagg atgctggtga attttctatc
61 agagacaaag gttatctcct acatgggctg cctgggtcca atgtacttct tcatggcctt
121 tgcgaacact gacagctacc tgctggcctc tatggccatc gaccggctgg tggccatctg
181 caacccctta cactatgatg tggctatgaa ctcccggcgt tgcctactca tgctattggg
45 241 ttcttgagc atctcccacc tacatccct gtccgggtg ctactatgt ctgcctgtc
301 ttctgtgcc tcccagtc ttaagcatt ttctgtgac acccagcctg tgctaaagct
361 gtctgctct gacacgtcct ccagccagat ggtggtcatg actgagacct tagctgttat
421 tgtgacccc ttctgtgta tcatctctc ctacctcgga atcatcatca ctgtgctcag
481 aatccccctc gcagccggga agtggagggc ctctctacc tctggctccc acctcactgt
50 541 agtagccctt ttctacggga gtattattta tgtctatctt aggccctgt ccatgtactc
601 agtgggtgaag gaccagtag ccacagttat gtacacagta gtgacaccc (SEQ ID NO:106).

OR70

LOCUS AF127883 649 bp DNA PRI 28-FEB-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA81) gene, partial cds.

5 ACCESSION AF127883

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

10 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

15 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
20 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

25 gene <1..>649

/gene="CJA81"

CDS <1..>649

/gene="CJA81"

/codon_start=2

30 /product="olfactory receptor"

/translation="FADICFTSTTVPKMLVLDIQTSKMITFAGCLTQIFFFVAFGCLD

NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLLVLGSWCISVMVSLLTLTILRLSFC

TNMEIPHFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR

VSQAQGGHKAFASTCGSHLSVVTIFYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ ID

35 NO:107).

BASE COUNT 130 a 184 c 136 g 199 t

ORIGIN

1 ctttctgac atctgctca catccacgac cgtcccaaag atgctggtgg atatccaaac

61 acaaagcaaa atgatcactt tgcagggtg cctcaccag attttttt tcgttcatt

40 121 tggatgcctg gacaattgc tctgaccgt gatggcctat gaccggtcg tggccatctg

181 tcacccctg cactacgcgg tcatcatgaa cccccggctc ttagactgc tagttctggg

241 gtctcgtgac atcagtgtca tggttctct gctcgagacc ttgaccatt tgaaggctgc

301 ctctgcaca aacatggaaa tccacactt ttttggat gttctgaag tctgaagct

361 cgctgttct gaaacctcg tcaataaaat cgtgatgat ttttgacaa ttgcaatggg

45 421 tgttttct ctctctgaa tctatactc ttattctcag atttctcct ccactctgag

481 agtatcacct gccaagggc agcaciaaagc ctttccacc tgggggtctc acctctcagt

541 ggtcacctg ttctatggca cgggccttgg ggtatatctc agttctgcag ctacaccac

601 ttctaggaca agtctgatg cctcgggtg gtacaccatg gtcaccccc (SEQ ID NO:108).

50 OR71

LOCUS AF127884 649 bp DNA PRI 28-FEB-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA82) gene, partial cds.

ACCESSION AF127884

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,

Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>649

/gene="CJA82"

CDS <1..>649

/gene="CJA82"

/codon_start=2

/product="olfactory receptor"

/translation="FADICFTSTTVPKMLVGIQTQSKMITFAGCLTQIFFFVAFGCLD

NLLLTVMAYDRFVAICHPLHYAVIMNPRLCRLVLGSWCISVMVSLLETILTILRLSFC

TNMEIPHFCDVLEVLKLACSETLVNKIVMYFVTIAMGVFPLSGILYSYSQIFSSILR

VSPAQQQHKAFASTCGSHLSVVTLFYGTGLGVYLSSAATPSSRTSLMASVMYTMVTP" (SEQ ID

NO:109).

BASE COUNT 129 a 183 c 137 g 200 t

ORIGIN

1 ctttgcgtgac atctgtttca catecacgac cgtcccaaag atgctggtgg gtaaccaaac

61 acaaagcaaa atgatcactt tgcagggtg cctcaccag attttttt tegtgcatt

121 tggatgcctg gacaattgc tctgaccgt gatggcctat gaccggtcg tggccatcg

181 tcacccctg cactacgcgg tcatcatgaa cccccggctc ttagactgc tagttctggg

241 gtctggtgc atcagtgtca tggtttctc gctcgagacc tggaccatt tgggctgctc

301 ctctgcaca aacatggaaa tccacactt ttttggat gttctcgaag tctgaagct

361 cgctgttct gaaaccctcg tcaataaaat cgtgatgtat ttttgacaa ttgcaatggg

421 tgttttct ctctctggaa tctatactc ttattctcag attttctct ccatcctgag

481 agtatcact gcccaaggcc agcacaagc ctttccacc tggggtctc acctctcagt

541 ggtcaccctg ttctatggca cgggccttgg ggtatatctc agttctcag ctacaccatc

601 ttctaggaca agtctgatgg cctcggtgat gtacaccatg gtcacccc (SEQ ID NO:110).

OR72

LOCUS AF127885 658 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY10 pseudogene, partial sequence.

ACCESSION AF127885

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 658)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 658)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..658

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>658

/gene="PPY10"

/pseudo

BASE COUNT 131 a 176 c 135 g 216 t

ORIGIN

1 cttgcctgac atcggtttca cctcccgcat ggtccccaag atgattgtgg acatccaatc
61 tcacagcaga gtcatttctt aggcaggcta cctgactcag atgtctctct ttgccatitt
121 tggaggcgtg gaagagagac atgctcctga gtgtgaaggc ctatgaccgg tttagacca
181 cctgtcaccc tctgtatcat tcagccatca tgaagtcatt ttctgtggc ttctagttt
241 tgtgtcttt tttttctc tcagtcttt agacgccaa ctgcacaact tgattgcctt
301 gcaaatgcc tgcttgagg atgtggaaat ttctaattc ttctgtgacc ctctcaact
361 cccctcttg catgttgga cagcttcacc gataacatca tcacgtatct cctgacgcc
421 atatccctt ttattccat ctgggggacc cttttctc taatatcaa ttgttctc
481 cattctgagg gcttcatcat caggtgggag gtataagcc ttctccatct gtgggtctca
541 cctgtcagtt gttgtctat ttatggaac aggcataatg gggtacctca gttcagatgt
601 gtcattctcc ctgagaaagg ctgcagtgcac ctacgtgatg tacaccgtgg tcaccccc (SEQ ID NO:111).

OR73

LOCUS AF127886 649 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY11) gene, partial cds.

ACCESSION AF127886

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Pongo pygmaeus"

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        /db_xref="taxon:9600"
gene      <1..>649
        /gene="PPY11"
CDS       <1..>649
5         /gene="PPY11"
        /codon_start=2
        /product="olfactory receptor"
        /translation="LADIGFTSTTVPKMIVDMQTHSRVISYAGCLTQMSFFVLFACMD
10        DMLLSVMAYDRFVAICHPPDYPVTMNPFCGFLVLLSFFLSLLDSQLHNWIALQITCF
        KDVEIPNFFCDPSQLPHLACCDTFTNDIVMYFLAAIFGFLPILGILFSYYKIVSSILR
        VSSSGGRYKAFATCGSHLSVVCLFYGTALGGYLSSDMSSYPRKGAVASVMYTVVTP" (SEQ
ID NO:112).

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BASE COUNT 125 a 174 c 130 g 220 t

ORIGIN

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15      1 cttggctgac atcggtttca cctccaccac ggtccccaag atgattgtgg acatgcaaac
      61 tcacagcaga gtcattcctc atgcaggctg cctgactcag atgtctttt ttgtccttt
      121 tgcattgatg gatgacatgc ttctgagtgt gatggcctat gaccggtttg tggccatctg
      181 tcacctcccg gattaccagg ttaccatgaa cccatgttgc tgggcttcc tagttttgtt
      241 gtctttttt ctgactcttt tagactccca gctgcacaat tggattgcct taaaaattac
20      301 ctgctcaag gatgtggaaa ttcccaattt cttctgtgac cttcccaac tccccacct
      361 tgcctgttgt gacaccttca ccaatgacat agtcatgtat ttcttgctg ccatatttgg
      421 tttcttccc atcttgggga tcctttctc ttactataaa atgtttcct ccattctgag
      481 ggtttcatca tcagtgaggga ggtataaagc ctctgccacc tgtggctctc acctgtcagt
      541 tgtttgctta tttatggaa cagcccttgg aggttacctc agttcagaca tgcctctta
25      601 tccagaaag ggtgcagtgg cttcagtgat gtacacagtg gtcaccccc (SEQ ID NO:113).

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OR74

LOCUS AF127887 654 bp DNA PRI 28-FEB-2000

30 DEFINITION Pongo pygmaeus PPY12 pseudogene, partial sequence.

ACCESSION AF127887

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

35 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 654)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

40 TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 654)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

45 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..654

/organism="Pongo pygmaeus"

50 /db_xref="taxon:9600"

gene <1..>654

/gene="PPY12"

/pseudo

BASE COUNT 124 a 178 c 135 g 217 t

ORIGIN

1 cttgctgaa atcggttca cctccaccac gatccccaag attgtggaca tccaatctca
61 cagcagagtc atctctctg caggcttgcc tgactcagat gtctcttgc catttttga
121 ggacacgaag agagacatgc tctgagtgat gatggcctat gaccggttg tagccatctg
181 tcacctcta tatcattcag tcatcatgag cccgtgttgc tgggcttcc tagttttgt
241 gtctttttt ttctctcag tcttttagac tcccagctgc accacttgat tgccttgcta
301 atgacctact tcaaggatgt ggaaattccg aatttctct gtgaccttc taaactccc
361 catattgcat gttgtgatgc ctccaccaat aacatcatca tgaattccc tgtaacatg
421 ttgcttttc ttcccatctc ggggactctt ttctcttact ctaatttgt ctctccatt
481 ctgagggttt cgtcatcagg tgggaaatat aaagccctct ccacctgtgg gtctactgg
541 tcagttgtt gctgagcttc tggaaacaggc gttggagggt acctcagttc agatgtgtca
601 tctccccca gaaagggtgc agtggcctca gtgatgtgca ccgtggtcac cgcc (SEQ ID NO:114).

OR75

LOCUS AF127888 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY49) gene, partial cds.
ACCESSION AF127888

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>649

/gene="PPY49"

CDS <1..>649

/gene="PPY49"

/codon_start=2

/product="olfactory receptor"

/translation="FVDTCFISTTVPKMLVNIQARSKEISYMGCLTQVYFLMMFAGMD

TFLAVMAYDRFVAICHPLQYAVIMNPHLCGLLVLASWFIIFWVSLVHILLMKRLTFS

TGTEIPHFFCELAQVLKVARSDTLNNIVLYVATALLGVFPVAGILFSYSQIVSSLMR

MSSTEGKYKAFSTCGSHLCVVSFLNGTGLGVYLSSAVTHSSQSSSMASVAMYAMVTP" (SEQ

ID NO:115).

BASE COUNT 119 a 187 c 146 g 197 t

ORIGIN

1 cttgtggac acctgtttca tctccaccac agtccccaag atgctagtga acatccaggc
61 acggagcaaa gaaatctct acatgggggtg cctcactcag gtgtatttt taatgatgtt
121 tgetggaatg gatactttcc tactggctgt gatggcttat gaccggttg tggccatctg
181 ccacccctt cagtacgcgg tcatcatgaa ccccatctc tgtggcctgc tggttctggc

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>648

/gene="PPY51"

/pseudo

BASE COUNT 128 a 183 c 134 g 203 t

ORIGIN

1 ctttctgac atctgtttg tgtctagcac tctaccaaag atgctggtga atatccagac
61 acacagcaaa gtcacacct atgcaggctg catcaccag gtgtgctttt tegtattctt
121 tgcaggattg gacatctttc tctgactgt gatggcctat gacggtttgt ggccatctgt
181 caccctctgc actacacggt catcatgagc cccaggctct gtggactgct ggttctggca
241 tctggatca tgagtgcctt gaattccttg ctacaaagct taatagtact gcggctttcc
301 ttctgcacag atttggaat ccccaacttt ttctgtgaac taatcaggt caccacatt
361 gcctgttctg acacctttct taacgacatg gtgatgtatt tgtcatctgc gttgtggggc
421 ggtgctccc tcactgggat cctttactct tactctaaga ttgttcctc catacgtgca
481 atctcatcag ctcaaggga gtaaaaggca tttccacct atgcgtctca cctctcagtt
541 gtctcttat ttatgggtac actcctaggg gtgtaccta gttctgctgc aaccacaac
601 tcatactcaa gtgctgcagc ctggtgatg tactgtgg tcaccccc (SEQ ID NO:118).

OR78

LOCUS AF127891 660 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY52 pseudogene, partial sequence.

ACCESSION AF127891

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..660
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>660
/gene="PPY52"
/pseudo

BASE COUNT 122 a 181 c 146 g 211 t

ORIGIN

1 cttgctgac atcagttca cctccaccac ggtccccaag atgattgtgg acatccaatc
61 tcacagcaga gtcattcct atgcaggctg cctgactcag atgtgtctcc tggccatttt
121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg ttgtagccc
181 ttgttcaccc tctatatcgt tcagccatct tgaacccgtg ttctgtggc ttcctagatt
241 tgttggtctt gtcttctt tctcagctt ttagactcc cagctgcgca acttgattgc
301 cttagcatg acctgcttca aggatgtgga aattcctaatt ttctctggg aaccttctca
361 actccccat ctacatttt gtgacacct caccagtaac atccacatgt atttcctgc
421 tgccgtatt ggtttcttc ccatctcggg ggcccttttc tctacgga aaattgttc
481 ctccattctg agggtttcat catcagggtg gaagtatcaa ccttctccac ctgtgggtct
541 cacctgtcag ttgttgcgt attttacgga acaggcgtg gagggtagct ggggtcagat
601 gtgtcatccc ccccgagaaa ggggtgcagt gcctcagtga tgtacacgtt ggtcaccccc (SEQ ID NO:119).

OR79

LOCUS AF127892 633 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY76 pseudogene, partial sequence.

ACCESSION AF127892

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 633)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 633)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..633
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>633
/gene="PPY76"
/pseudo

BASE COUNT 134 a 155 c 124 g 220 t

ORIGIN

1 cttgctgac attggttca ccttgccac ggtccccaag atgattgtag acatgcaatc
61 acatagcaaa gtcattccc atcgggctg tctgacacag atatctttt ttgtcctttt

121 tgcattgata gatgacatgc tctgactgt gatggcctat gactgattcg tggccatctg
 181 tcacccctg aactaccag tcatcatgaa tctcacctc tgtgttct tagtgttggt
 241 gtcttttcc ttagcctgtt ggattcccag ctgcacaatt ggattgttac aattcacctg
 301 cttcaagaat gtggaaatct ttaatttct ctgtgactga tctcaacctt gcctgttctg
 361 actgtgtcat cagtaacata ttcatacatt tagatagtag aatacttggg ttcttccca
 421 ttccaggat cctttgtct tactataaaa ttgtgccctc cattctaaga attccattgt
 481 cagatgggaa gtataagcc ttctccacct gtggtctca cctggcaatt gttgcttat
 541 ttatggaac aggcattggg gtgtacctga cttcagctgt gtcactatcc cccaggaatg
 601 gtgtgtcag tgtgtatgt tgtggccacc ccc (SEQ ID NO:120).

OR80

LOCUS AF127893 648 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY77 pseudogene, partial sequence.

ACCESSION AF127893

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..648

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>648

/gene="PPY77"

/pseudo

BASE COUNT 140 a 172 c 129 g 207 t

ORIGIN

1 cttgtctgac ctctgttta cctccacaac cgtcccaaag atgctactga atatactgac
 61 acagaacaaa ttcataacat atgcaggctg tctcggtcag atttctttt tcaattcatt
 121 tggatgcctg gacaatttac tcttgaccgt gatggcctat gaccgctca tggccatctg
 181 tcacccctg cactacacac ggtcatcatg aaccaccagc tctgtggact gctggttcta
 241 gggctctagt gcatcagtgt catgggtccc tgctcaagac ctgactgtt ttgaggctgt
 301 cctctgcaca aaatggaaat tccacacttt tttgtgac ttctgaagt cctgaagctc
 361 gcctgttctg acaccttcat caataacgta gtgatatact ttgcaactgg catcctgggt
 421 gtgattccct tcaactggaat acttttctt tactataaaa ttgtttctc tatactgagg
 481 atttctcag ctgggagaaa gtgcaaagcg ttctccacct gtggttccca cctctcagt
 541 gtacgttgt tcatggcac aggttttggg gtctatctca gttctgcagc tacaccatct
 601 tctaggacaa gtctgtgtgc ctacgtgatg tacaccatgg ttaccccc (SEQ ID NO:121).

OR81

LOCUS AF127894 660 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY78 pseudogene, partial sequence.

ACCESSION AF127894

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 660)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..660

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>660

/gene="PPY78"

/pseudo

BASE COUNT 118 a 185 c 140 g 217 t

ORIGIN

1 cttgcctgac atcggtttca cctccaccac ggcccccaag atgattgtgg acatccaatc

61 tcacagcaga gtcattcct atgcaggctg cctgactcag atgtgtctcc tggccatttt

121 tggaggcatg gaagagagac atgctcctga gtgtgatggc ctatgagcgg ttgtagccc

181 tctgtcacc tctatatcgt tcagccatct tgaacccgtg ttctgtggc ttctagatt

241 tgtggtcttt gttttcttt tctcagtct ttagactcc cagctgcaca acttgattgc

301 cttacgcattg acctgcttca aggatgtgga aattcctaatt ttctctggg aaccttctca

361 actccccat cttacatttt gtgacacctt caccagtaac atccacatgt attccctgc

421 tgccgtattt gggtttcttc ccatctcggg ggcccttttc tctactgta aaactgtttc

481 ctccattctg aggggttcat catcagggtg ggagtatcaa cttctccac ctgtgggtct

541 cacctgtcag ttgttgctt atttatgga acagcccttg gaggtacct cagttcagct

601 gtgtcccttt cctccaggaa gggtgcagtg gcctcagtga tgtacctgt ggtcaccccc (SEQ ID NO:122).

OR82

LOCUS AF127895 649 bp DNA PRI 28-FEB-2000

DEFINITION Pongo pygmaeus PPY85 pseudogene, partial sequence.

ACCESSION AF127895

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for

reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
10 /organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY85"
/pseudo
15 BASE COUNT 118 a 174 c 131 g 226 t
ORIGIN
1 cttgctgac atcagtttg cctctaccac ggtccccaag atgattgtgg acatccaggc
61 tcacagcaga ctcatctct atgtgggctg cctgactcag atgtctttt tgatccttt
121 cgcatgtatg gaaagtctgc tctgactgt gatggcctat gaccggttg aggccatctg
20 181 tcacccctg cactcccaag tcacacgag cccacgactc tgtgcctct tagtttgggt
241 gtctttttt cttagccttt tggactctca gctgcacaat ttgattgtgt tacaacttac
301 ctgcttcaat gatgtggaaa tctctaatt ttctctgtga cccttctcaa ctctcagcc
361 tggcctgttc tgacacctcc attaataaca tggctgtata tttattggt gccatattg
421 gttttctccc tctcttaggg atcctttct ctactataa aattattct tccattctgc
25 481 gagttcgctc ttcagtgagg aagtataag ccttctccac ctgcagctct cacctgtcag
541 ttgtttgctt atttatgga acagcccttg gagggtaacct cagttcagct gtgtcccttt
601 cctccaggaa ggggtcagtg gcctcagtga tgtacctggt ggtcacccc (SEQ ID NO:123).

OR83

30 LOCUS AF127896 649 bp DNA PRI 28-FEB-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY9) gene, partial cds.
ACCESSION AF127896
KEYWORDS .
35 SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 649)
40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
45 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
50 source 1..649
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>649
/gene="PPY9"

CDS <1..>649
 /gene="PPY9"
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFASTTVPKMLVNIQAQSKVITYAGCITQMYFFTHFVGLD
 SFLTVMAYDRFVAICHPLHYTVIMNPQLCGLLVLASWIMSVLHSLQLSLMVLRLSLC
 RELEIPHFCELNQVIHLACSDTFLDDMVMYLA AVLGGGCLAGILYSYKIVSSICA
 ISSAQGKYKAFSTCASHLSVVSFLFYCTSLGVYLSAAIHNSHSSAIASVMYTVVTP" (SEQ ID

NO:124).

BASE COUNT 136 a 173 c 140 g 200 t
 ORIGIN

1 cttttagac atctgttttg cctctaccac ggtcccaaag atgctggtga atatccaggc
 61 acagagcaaa gttatcacct atgcaggctg catcaccag atgtacttt tcacacatt
 121 tgtaggattg gacagcttcc tcctaactgt gatggcctat gaccggttg tggccatctg
 181 tcacccctg cactacacgg tcatcatgaa ccctcaactc tgtggattgc tggttctggc
 241 gtcctggatc atgagtgtct tgcattcctt attacaaagc ttaatgggac tgcgggtgtc
 301 cttatgcaga gagttggaaa tcccccaactt ttctgcgaa cttaatcagg tcatccacct
 361 tgcctgttct gacacctttc ttgatgacat ggtgatgtat ttggcagctg tgcgtctggg
 421 tgggggatgt ctcgctggga tcctttactc ctactctaag atagtttct ccatatgtgc
 481 aatctcatca gctcaaggga agtataaggc attttccacc tgtgcatctc acctctcagt
 541 tgtctccttg tttattgta cgagcctagg agtgtacctt agctcggctg caatccacaa
 601 ctcacactca agtgcaatag cctcagtgat gtacaccgtg gtcaccccc (SEQ ID NO:125).

OR84

LOCUS AF127897 649 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO27) gene, partial cds.
 ACCESSION AF127897
 KEYWORDS .
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>649
 /gene="SBO27"
 CDS <1..>649
 /gene="SBO27"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LVDFCLATDTIPKMLVSLQTRSKAISYPCCLTQMYFFHFFGIVD

SVLIAVMAYDRFVAICHPLHYATIMSPRLCGLLVGAPWVFSCFISLTHILLMARLVFC
 GSLKVPHYLCDLTPILRLSCTDTSVNRIFILTVAGMVIATPFICILASYACILVAIMK
 IPSAGGRKKAFTSCSSHLSVVALFYGTITIGVYLCPSVHTAVKEKASAVMYTVVTP" (SEQ ID

NO:126).

5 BASE COUNT 112 a 218 c 145 g 174 t

ORIGIN

1 cctggtgat ttctgtctgg ccaccgacac catcccaag atgctggtga gccttcaaac
 61 caggagcaag gccatctctt atccctgctg cctgaccag atgtacttct tccattctt
 121 tggcatcgtg gacagcgtct taattgctgt aatggcgat gaccgcttg tgccatctg
 10 181 ccaccccttg cactacgcca ccatcatgag cccacgcctc tggcgctgc tggcggggc
 241 ccctgggtg ttctcatgct tcactcact caccacatc ctctgatgg cccgcctctg
 301 ttctgcggc agcctcaagg tgcctcatta ctgtgcgac ctactccca tctccgact
 361 ttcgtgcaca gacacgtctg tgaacaggat ttcatcctc actgtggcag ggatggtgat
 421 agccacgccc ttcatctgca tctggcctc ctatgcttg atcctttag ccatcatgaa
 15 481 gatccctct gcaggtggca ggaagaaagc ctctccacc tgcagctccc acctgtccgt
 541 ggtgtctct ttctatggga ccaccattgg ggtctacctg tgcctctct cgtccacac
 601 cgctgtaag gagaaagctt ctgctgtgat gtacacagta gtcacccc (SEQ ID NO:127).

OR85

20

LOCUS AF127898 646 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO28) gene, partial cds.
 ACCESSION AF127898
 KEYWORDS .

25

SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

30

REFERENCE 1 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished

35

REFERENCE 2 (bases 1 to 646)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

40

FEATURES Location/Qualifiers
 source 1..646
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"

45

gene <1..>646
 /gene="SBO28"
 CDS <1..>646
 /gene="SBO28"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LADIGFTSTTVPRITVNIQTHSRVIA YASCLTQMSFSIFFACME
 50 DTLAVMAYDRFVAICHPLHYVIMNPRLCGFLVLSVFLSLLISQVHNLIVLQFSCF
 KEIKISNFFCDPSQLLTLSCSDTFVNIVTNFFAAVFGFLPISGIFFSYKYIAPSILR
 VPLSSGKYKAFSTCSSHLAVVCLFYGTIVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID

NO:128).

BASE COUNT 137 a 167 c 122 g 220 t

ORIGIN

1 cttggctgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atgcgagctg cctgacacag atgtctttt caatatttt
121 tgcgtgatg gaagacacgc tctggctgt gatggcctat gaccggttg ttgccatctg
181 tcacccctg cactaccag tcacatgaa cccacgactc tgtggttct tagtggtgt
241 gtctgtttt cttagcttt taatatcca ggtgcacaat ttgattgtc tacaatttc
301 ttgctcaaa gagataaaga ttctaattt ctctgtgac ccttctaac tctcaccct
361 ttctgttct gacaccttg tcaatacat agtcacgaat ttcttgctg ctgtatttg
421 ttttctccc atctcaggga tcttttctc ttactataaa attgccccct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc ttagctctc acctggcagt
541 tgtttgctta tttatggaa cagtcattgg agtgtacctt gggatcatca tggcatcccc
601 caggaagagt gtggtggcct cagtgtatga cacagtggc actccc (SEQ ID NO:129).

OR86

LOCUS AF127899 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO29) gene, partial cds.
ACCESSION AF127899

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

gene <1..>649

/gene="SBO29"

CDS <1..>649

/gene="SBO29"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD

IFMLTVMAYDRYVAICHPLHYTVTNPRCLGLLVLASWILSALNSSLQTLIVRLSFC

TDLEIPRFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGHYSYSKIVSSIRA

ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSGAAALVMYTVVTP" (SEQ ID

NO:130).

BASE COUNT 138 a 177 c 133 g 201 t

ORIGIN

1 cttgttagac atctgtttt gtctaccac tgtccgaag atgctgtaa atatccagac
61 acacagcaaa gtcacacct ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tctgactgt gatggcctat gaccggtatg tggccatctg
181 tcacccctg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc

241 atcctggatc ctgagtgcgc tgaattctc attacaaacc ttaatagtgc tgcggcttc
301 ctctgcaca gacttggaaa tccccgcctt ttctgcgaa cttaatcagg tcatacatc
361 tgcctgttat gacactttcc ttaatgatgt ggtgatgtat ttggcagcta tgcctctggg
421 cggtggtccc ctacaggaa ttatttact ttacttaag atagtctct ccatacgtgc
481 aatctcatca gctcagggga agtacaaggc gttttccacc tgtgatctc acatcttaat
541 tgtctcctta ttttaaggta cactctagg tgtgtacct agttctgctg caactggcaa
601 ctacattca ggtgctgcag ccttggtgat gtacactgtg gtcacccc (SEQ ID NO:131).

OR87

LOCUS AF127900 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO30) gene, partial cds.
ACCESSION AF127900
KEYWORDS .

SOURCE Bolivian squirrel monkey.

ORGANISM *Saimiri boliviensis*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

reduction of function in primates

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France

FEATURES	Location/Qualifiers
----------	---------------------

source 1..649

/organism="Saimiri boliviensis"

<1..>649

/gene="SBC

<1..>649

/codon_start=2

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/translation="FVDICFVSTTVPKMLVNIQTHSKVITFADCITQIGHCLLFAALD
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TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA

1001/1002

Abstract

ORIGIN

61 acacagcaaa gtcacacct ttgcagactg catcaccag ataggccatt gcctact

181 tcacccctg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc

301 cttctgcaca gacttggaaa tcccccaatt ttcttgcgaa cttaatcagg tcatacatct

421 cgggtggtccc ctcacaggaa ttatttactc ttactctaag atagtctcct ccatacgtgc

[illegible]

541 tgtctcctta tttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agtgctgcag ccttggtgat gtacacagtg gtcaccccc (SEQ ID NO:133).

OR88

LOCUS AF127901 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC31) gene, partial cds.
ACCESSION AF127901
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..649
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>649
/gene="SSC31"
CDS <1..>649
/gene="SSC31"
/codon_start=2
/product="olfactory receptor"
/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD
IFMLTVMAYDRYVAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLSFC
TDLEIPHFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIIYSYSKIVSSIRA
ISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSHSSAAALVMHTVVTP" (SEQ ID
NO:134).
BASE COUNT 141 a 178 c 131 g 199 t
ORIGIN
1 cttttagac atctgttttg tgtctaccac tgtcccgaag atgctggttaa atatccagac
61 acacagcaaa gtcacacact ttgcaggctg catcacccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggatg tggccatctg
181 tcaccccttg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgcc tgaattctc attacaaacc ttaatagtgc tgcggctttc
301 cttctgcaca gacttggaaa tcccccaact tttctcgaa cttaatcagg tcatacatct
361 tgcctgttat gacatttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgtggg
421 cggtggtccc ctcacaggaa ttatttactc ttaactaag atagtttct ccatcgtgc
481 aatctcatca gtcagggga agtacaaggc gtttccacc tgtgcatctc acatcttaat
541 tgtctcctta tttatggta cactcctagg tgtgtacctt agttctgctg caactggcaa
601 ctcacattca agtgctgcag ccttggtgat gcacacagtg gtcaccccc (SEQ ID NO:135).

OR89

LOCUS AF127902 646 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC32) gene, partial cds.
5 ACCESSION AF127902
KEYWORDS .
SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
20 Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
25 gene <1..>646
/gene="SSC32"
CDS <1..>646
/gene="SSC32"
/codon_start=2
30 /product="olfactory receptor"
/translation="LADIGFTSTTVPRIVNIQTHSRVIA YASCLTQVSFSIFFACME
DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVLVSVFLSLLISQVHNLIVLQFSCF
KEIKISNFFCDPSQLLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYKIASILR
VPLSSGKYKAFSTCSSHLAVVCLFYGTVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID
35 NO:136).
BASE COUNT 135 a 166 c 123 g 222 t
ORIGIN
1 cttggtgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atcgagctg cctgacacag gtgtctttt caatctttt
40 121 tgcgtgatg gaagacacgc tcttggtgt gatggcctat gaccggttg ttgccatctg
181 tcacccctg cactaccag tcatcatgaa cccagcactc tgtggcttct tagtgttgt
241 gtctgtttt cttagcctt taatatcca ggtgcacaat ttgattgtct tacaatttc
301 ttgctcaaa gagataaaga ttctaattt cttctgtgac cttctcaac tctcaccct
361 ttctgttct gacaccttg tcaataacat agtcacgaat ttcttctg ctgtatttgg
45 421 ttttctccc atctcaggga tcttttctc ttactataaa attgcctcct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc ttagctctc acctggcagt
541 tgtttgctta tttatggaa cagttattgg agtgtacctt gggcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgtatga cacagtgtc actccc (SEQ ID NO:137).

OR90

LOCUS AF127903 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC33) gene, partial cds.
ACCESSION AF127903

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>649

/gene="SSC33"

CDS <1..>649

/gene="SSC33"

/codon_start=2

/product="olfactory receptor"

/translation="FSDLCFSSVTIPKLLQNMQSQDPSIPYAGCLTQMYFFLYFSDLE SFLLVAMAYDRYVAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLMARLRFC ADNVLHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPLLLIIGSYARIVFSILK VPSSKGICKAVSTCGSHLSVVSIFYGTVIGLYLCPANNSTLKETVMAVMTVMAP" (SEQ ID NO:138).

BASE COUNT 115 a 192 c 134 g 208 t

ORIGIN

1 cttctctgac ctctgttct ctctgtgac cattccaaag ttgtacaga acatgcagag

61 ccaagaccca tccatccct atcgggctg cctgaccag atgtactct tctgtattt

121 ttccgatcta gagagcttc tctgtggc catggcctat gaccgctacg tggccatctg

181 cctcccccta cattacgcca ccatcatgag ccccatgctg tctcgtccc tgggtggcgt

241 gtccctgggtg ctgaccacct tccatgcat gttgcacact ttactcatgg ccaggttgcg

301 ttttctgca gacaatgta tctccactt tttctgtat atgtctgctc tgctgaagct

361 ggctgtctct gacctcgag ttaatgaatt ggtgatatt atcatgggag gcctcattct

421 tgtcatccca ctctactta tcatgggctc ctacgcacga attgtctct ccatcctcaa

481 ggtccctct tctaaggga tctgcaaggc cgtctctact tgtggctccc acctctctgt

541 ggtgtcactg ttctatggga ctgtattgg tctctactta tgcccatcag ctaataatc

601 tactctaaag gagactgtca tggctgtgat gtacactgtg atggccccc (SEQ ID NO:139).

OR91

LOCUS AF127904 646 bp DNA PRI 28-FEB-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC34) gene, partial cds.

ACCESSION AF127904

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
5 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 646)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
10 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..646
/organism="Saimiri sciureus"
/db_xref="taxon:9521"
15 gene <1..>646
/gene="SSC34"
CDS <1..>646
/gene="SSC34"
/codon_start=2
20 /product="olfactory receptor"
/translation="LADIGFTSTTVPRITVNIQTHSRVIA YASCLTQMSFSIFFACME
DTLLAVMAYDRFVAICHPLHYPVIMNPRLCGFLVL VSVFLSLLISQVHNLIVLQFSCF
KEIKISNFFCDPSQLLTLSCSDTFVNNIVTNFFAAVFGFLPISGIFFSYKYKIASSILR
VPLSSGKYKAFSTCSSLHAVVCLFYGTVIGVYLGSSMASPRKSVVASVMYTVVTP" (SEQ ID
25 NO:140).
BASE COUNT 136 a 167 c 122 g 221 t
ORIGIN
1 ctggctgac attggttca cctccaccac agtccccagg acaattgtga acattcaaac
61 tcacagcaga gtcacgcct atgcgagctg cctgacacag atgtctttt caatctttt
30 121 tgcgtgtatg gaagacacgc tcttggtctg gatggcctat gaccggttg ttgccatctg
181 tcacccctg cactaccag tcalcatgaa cccacgactc tgtggcttct tagtgttggt
241 gtctgtttt cttagccttt taatatccca ggtgcacaat ttgattgtct tacaatttc
301 ttgctcaaa gagataaaga ttctaattt cttctgtgac ccttctaac tctcaccct
361 ttctgttct gacaccttg tcaataacat agtcacgaat ttcttgctg ctgtatttg
35 421 tttcttccc atctcaggga tcttttctc ttactataaa attgcctcct ccattctgag
481 agttccatta tcaagtggga agtataaagc cttctccacc ttagctctc acctggcagt
541 tgtttgctta tttatggaa cagtcatgg agtgtacctt gggtcatcaa tggcatcccc
601 caggaagagt gtggtggcct cagtgatgta cacagtggc actccc (SEQ ID NO:141).

40 **OR92**

LOCUS AF127905 649 bp DNA PRI 28-FEB-2000
DEFINITION Saimiri boliviensis SBO64 pseudogene, partial sequence.
ACCESSION AF127905
45 KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
50 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory gene repertoire in primates and mouse: evidence for
reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>649
 /gene="SBO64"
 /pseudo
 BASE COUNT 145 a 157 c 129 g 218 t
 ORIGIN
 1 cttgtcgat ttctgtatt ccaccaccgt tatacccaaa ctgctggaga acttggtgt
 61 ggaagacaga agcatctcct tcacaggatg cgtcatgcaa ttctttttg ccagcatatt
 121 tgtgtgaca gaaatattca tgctggcagt gatggcctat gacagatttg tgggtggtg
 181 ttacctctg ctctacacag ttgcaatgc ccagaggctt ttcttttgt tagtggtctac
 241 atcatactc aggggtgacag tctgtttct gacaattacc ttcttctcc tgggaattac
 301 cttcagagga aataatatca ttaataactt tgtgtgtgag cctgctgccca ttgtgtctgt
 361 gccatgctt gaccctaca tgagccagga aatcatttcc atttctgccca cattcaatga
 421 aacaagcagc ctgatgatca ttctcacctc ctaagatttc gttttatca atgtcatgat
 481 gatgcctcc actggggggc gcataaaagc atgcgcgacc tgttctccc agctgaccgc
 541 cattatcatt ttcatggga ccatacttt tctctattgt gttcctaact ccaaaagttc
 601 atggctcatg gtcaagggtg gctctatctt ttacacagtg gtcacccc (SEQ ID NO:142).

OR93

LOCUS AF127906 649 bp DNA PRI 28-FEB-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO65) gene, partial cds.
 ACCESSION AF127906
 KEYWORDS .
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory gene repertoire in primates and mouse: evidence for
 reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>649
 /gene="SBO65"
 CDS <1..>649
 /gene="SBO65"

/codon_start=2
 /product="olfactory receptor"
 /translation="FVDICVTSTTIPKTLNIIQTHSKVITYAGCVTQLYFSVLFGLD
 SLLLTVMAYDRFVAICHPLRYMVIMNPQLCGLLVLSWIMSALHSLTESLMALSLLFC
 5 TDLKILHFFCELNQIIHIACSDTCLNNLVMYLSAVLLGGGPLAGILYSYSKIASSIRA
 ISSAKGKYKAFSTCASHLSVVSIFYCTGLGVYLSAATHNSLSSTAASVMYTVVTP" (SEQ ID

NO:143).

BASE COUNT 141 a 180 c 130 g 198 t

ORIGIN

1 cttttagac atctgtgta cctccaccac gattccaaag acactatcaa acatccagac
 61 acacagcaaa gtcacacat atgcagcgtg tgtcaccag ttgtacttt ctgtactctt
 121 tatagggttg gacagcttac tcctgacct gatggcctat gaccgattg tgcccatctg
 181 tcacccctg cgctacatgg tcatcatgaa cctcagctc tgggactgc tggttctggt
 241 gtctggatc atgagtgcc tcctccactt ttctgtgaa ctaatcaga taatccacat
 301 ctttgtaca gactgaaaa tcctccactt ttctgtgaa ctaatcaga taatccacat
 361 tgcctgttct gacacctgac ttaataacct ggtgatgtat ttgtcagctg tgcgtctggg
 421 cggtgtctct ctgctggga tcctgtactc ttactctaag atagcttct ctatagctgc
 481 aatctcatca gctaaggga agtacaaggc atttccacc tgtgcatctc acctctcagt
 541 tgtctcctta ttatttgta caggcctagg ggtgtacctg agttctgctg caaccacaa
 601 ctactctca agtacagcag cctcggtgat gtacactgtg gtcaccccc (SEQ ID NO:144).

OR94

LOCUS AF127907 649 bp DNA PRI 28-FEB-2000
 25 DEFINITION Saimiri sciureus olfactory receptor (SSC69) gene, partial cds.

ACCESSION AF127907

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory gene repertoire in primates and mouse: evidence for
 35 reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

40 JOURNAL Submitted (17-NOV-1999) IGH, CNRS UPR, 141 rue dec la Cardonille,
 Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..649

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>649

/gene="SSC69"

CDS <1..>649

/gene="SSC69"

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFVSTTVPKMLVNIQTHSKVITFAGCITQIGHCLLFAALD

IFMLTVMAYDRYVAICHPLHYTVTINPRCLGLLVLASWILSALNSSLQPLIVLRLSFC

TDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGIHYSYSKIVSSIRA

ISSAQGKYKAFSTCASHILIVSLFYGTLLGAYLSSAATGNSHSSAAALVMYTVVTP" (SEQ ID NO:145).

BASE COUNT 139 a 179 c 131 g 200 t

ORIGIN

5 1 cttttagac atctgtttg tgtctaccac tgtcccgaag atgctggtaa atatccagac
61 acacagcaaa gtcacacct ttgcaggctg catcaccag ataggccatt gcctactctt
121 tgcagcattg gacatcttta tgctgactgt gatggcctat gaccggatg tggccatctg
181 tcaccccctg cactacacag tcaccattaa cccagactg tgtggactgc tggttctggc
241 atcctggatc ctgagtgccc tgaattctc attacaacc ttaatagtgc tgcggcttgc
10 301 cttctgcaca gactggaaa tccccactt tttctgogaa cttaatcagg tcatacatct
361 tgcctgttat gacacttcc ttaatgatgt ggtgatgtat ttggcagcta tgctgctggg
421 cgggtggccc ctcacaggaa ttattactc ttactctaag atagtttct ccatactgac
481 aatctcatca gtcaggggga agtacaaggc gtttccacc tggcatctc acatcttaac
541 tgtctcctta tttatggta cactcctagg tgcgtacctt agttctgctg caactggcaa
15 601 ctcacattca agtgcgtcag ccttggatgat gtacactgtg gtcaccccc (SEQ ID NO:146).

OR95

LOCUS AF179716 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA133) gene, partial cds.

ACCESSION AF179716

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>487

/gene="PPA133"

CDS <1..>487

/gene="PPA133"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC

FCADNVIPHFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLILGSYARIVSSI

LKVPSSKGICKAFSTCGSHLSVVSLFYGTIIGLYFCPSANSSTLKETVMAMMYTVVTP
ML" (SEQ ID NO:147).

BASE COUNT 82 a 141 c 107 g 157 t

ORIGIN

1 tgtggccatc tgetcccc tgcactacac cgccatcatg agccccatgc tctgtctcgc

61 cctggtggcg ctgtctggg tgcagaccac cttccatgcc atgttacaca ctttactcat
121 ggccagggtg tgttttgg cagacaatgt gatcccccac ttttctgtg atatgtctgc
181 tctgtgaag ctggcctgct ctgacctcg agtcaatgaa ttggtgatat ttatcatggg
241 agggctgatt ctgtcatcc cattctact catcctggg tctatgcac ggattgtctc
301 ctccatcctc aaggccctt cgtctaaggg tatctgcaag gcgttcteta ctgtggctc
361 ccacctctct gtggtgtcac tgttctatgg gaccattatt ggtctctact tctgcccatc
421 agctaatagt tctactctaa aggagactgt tatggctatg atgtacactg tggtagacccc
481 catgctg (SEQ ID NO:148).

OR96

LOCUS AF179717 486 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA134) gene, partial cds.
ACCESSION AF179717

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>486

/gene="PPA134"

CDS <1..>486

/gene="PPA134"

/codon_start=2

/product="olfactory receptor"

/translation="VAICQPLHYSTLLSPWACMAMVGTSWLTGIITATTHAFLIFSLP

FPSRPIIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMIPFSLIVTSYIRILGAI

LAMASTQSRRKVFSTCSSHLLVVSLLFGTASITYIRPQAGSSVTTDRVLSVFYTVITP

ML" (SEQ ID NO:149).

BASE COUNT 85 a 181 c 97 g 123 t

ORIGIN

1 tttgccatc tgcagcctc tgcactact taccctcttg agcccatggg cctgcatggc
61 catggtgggc acctctggc tcacaggcat catcacggcc accacccatg ccttctcat
121 cttctcteta ccttttcca gccgccaat catccacac tttctctgtg acatcctgcc
181 agtactgagg ctggcaagtg ctgggaagca caggagcgag atctctgtga tgacagccac
241 tgtagtcttc attatgatcc cttctctct gattgtcacc tttacatcc gcatcctggg
301 agccatccta gcgatggcct ccaccagag ccgccgcaag gtcttctcca cctgctctc
361 ccatctgtctc gtgtctctc tctcttttg aacagccagc atcacctaca tccggccgca
421 ggcaggctcc tctgttacca cagaccgct cctcagtgtg ttctacacgg tcacacacc

481 catgct (SEQ ID NO:150).

OR97

5 LOCUS AF179718 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA135 pseudogene, partial sequence.
ACCESSION AF179718
KEYWORDS .
SOURCE baboon.
10 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 487)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA135"
30 /pseudo
BASE COUNT 112 a 140 c 89 g 146 t
ORIGIN
1 tgtggacatc tgaagtcctt tgactaccc agtcatcatg aacgaaagaa cacggggccaa
61 actggtgct gcttctggt tccagggctt tctgtagct actgtgcaga ccacgtggct
35 121 cttcagcttt ccattctgtg gcaccaacaa ggtgaaccac ttctctgtg acagcccacc
181 tgtgctgaag ctggtctgtg tagacacagc actgtttgag atctacacca tcttggaac
241 cattctggtg gtcatgatcc cctgcttctg gatcttgtgt tctacactc tcttgctgc
301 tgccatcctc aagatcccat cagctaaagg gaagcataaa gcccttctct cgtgatcctc
361 acatctcctt gttgtctctc tttctatct atcattaaac ctcacatatt ttcagcctaa
40 421 atcaaataat tctctgaaa gcaaaaagct gctatcattg ttctacactg ttgtgactcc
481 catgttg (SEQ ID NO:151).

OR98

45 LOCUS AF179719 482 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas PPA136 pseudogene, partial sequence.
ACCESSION AF179719
KEYWORDS .
SOURCE baboon.
50 ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.
REFERENCE 1 (bases 1 to 482)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 5 REFERENCE 2 (bases 1 to 482)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 10 FEATURES Location/Qualifiers
 source 1..482
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>482
 15 /gene="PPA136"
 /pseudo
 BASE COUNT 91 a 151 c 96 g 144 t
 ORIGIN
 1 tgtggccatc tgccaccccc tctactatgt cacagccatg agtctctggac tctgtatctt
 20 61 gctcctctgc ttgtgttggg ggctctctgt tctctatggt ctctctctca ctctctctct
 121 gaccagggtg acctctctgt ggactcaaga gatccactac ctctctgtg agatgtactg
 181 cctgctgcag ctggcatgtt ccaacaccca catcattcac acagtgtctgg ttgctactgg
 241 ctgctttctt ctctgacccc ttagggttca cgactacatc ctatatacgt attgtcagaa
 301 ccatacttca gataccctca gcctctaaga aacacaaaac ctctctgcc tgtgcctcac
 25 361 atttgggtgt ggtctcctc tttatggga cacttggtat ggtatacctg cagcccctcc
 421 acactactc catgaaggac tcagtagcca cagtgatgta tgctgtggtg acacctatga
 481 tg (SEQ ID NO:152).

OR99

30 LOCUS AF179720 481 bp DNA PRI 31-DEC-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA137) gene, partial cds.
 ACCESSION AF179720
 KEYWORDS .
 35 SOURCE baboon.
 ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.
 40 REFERENCE 1 (bases 1 to 481)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 45 REFERENCE 2 (bases 1 to 481)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 50 FEATURES Location/Qualifiers
 source 1..481
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>481

LKKKSVKGIRKAFSTCGAHLFSVCLYYGPLLFMYVGPASPQADDQDMVECVFYTVIIP
FL" (SEQ ID NO:155).

BASE COUNT 117 a 106 c 74 g 190 t
ORIGIN

5 1 tgtagccata tgcaaacctt tactttatcc agtgattatg accaatggac tgtgcatccg
61 gctattagtc ttgtcatttg taggtggcct ccttcacgcc ttaattcatg aaggcatttt
121 attcagatta accttctgta attctaact aatacatcac tttactgtg acattatccc
181 attgttaacg atttctgta ctgacccttc tattaatttt ttaatgcttt ttattttgtc
241 tggttcaata caggatttca ctattttgac tgttctgtc tcttatgcat ttgtcctett
10 301 tacaatctta aaaaaaaagt cagtcaaagg cataaggaaa gccttttcca cctgtggagc
361 ccattctctc tctgtctgtt tatactatgg cccctctc ttcattgtat tgggcctctg
421 atctccacaa gcagatgatc aagatatgt agagtgtgta ttttacctg tcatcattcc
481 ttctta (SEQ ID NO:156).

15 **OR101**

LOCUS AF179722 487 bp DNA PRI 31-DEC-2000
DEFINITION Papio hamadryas olfactory receptor (PPA139) gene, partial cds.
ACCESSION AF179722

20 KEYWORDS .
SOURCE baboon.
ORGANISM Papio hamadryas
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
25 Papio.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
30 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
35 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
40 gene <1..>487
/gene="PPA139"
CDS <1..>487
/gene="PPA139"
/codon_start=2
45 /product="olfactory receptor"
/translation="VAICNPLLYMVVVSRRRLCLLLVSLTYLYGFSTAIVVSPCIFSMS
YCSSNIINHIFYCDIAPLLALSCSDTYLPEAIVFISAATNLVFSMITVLVSFNVLSI
LRMHSSEGRKKAFSTCASHMMAVTVFYGTMLFMYLQPQTNHSLDSDKMASVFYTLVIP
ML" (SEQ ID NO:157).

50 BASE COUNT 110 a 111 c 85 g 181 t
ORIGIN

1 tgtggccatt tgtaaccctc tgcctcatc ggtgggtgtg tctcgcggc tctgctcct
61 gctgtctcc ctcacatacc tctatggctt ttctacagct atttggttt caccttgat
121 attctctatg tcttattgct cttctaataa aatcaatcat ttttactgtg atattgcacc

181 tctgttagca ttatcttgct ctgatactta cttaccagaa gcaatagtct tcatatctgc
 241 agcaacaaat ttggtttttt ccatgattac agttctagta tcttattca atattgtttt
 301 gtccattcta aggatgcatt catcagaagg aaggaaaaaa gccttttcca cctgtgcttc
 361 acatatgatg gcagtcacag ttttctatgg gacaatgctg ttcattgatt tgcagcccca
 421 aaccaaccac tcactggata ctgataagat ggcttctgtg ttttacacat tggtgattcc
 481 tatgctg (SEQ ID NO:158).

OR102

LOCUS AF179723 487 bp DNA PRI 31-DEC-2000
 DEFINITION Papio hamadryas olfactory receptor (PPA140) gene, partial cds.
 ACCESSION AF179723
 KEYWORDS .
 SOURCE baboon.

ORGANISM Papio hamadryas
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Papio hamadryas"
 /db_xref="taxon:9557"
 gene <1..>487
 /gene="PPA140"
 CDS <1..>487
 /gene="PPA140"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC
 FCADNVIPHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLILGSYARIVSSI
 LKVPSSKGICKAFSTCGSHLSVVSFLFYGTIIGLYFCPSANSSTLKETVMGMMYTVVTP
 ML" (SEQ ID NO:159).

BASE COUNT 82 a 141 c 108 g 156 t

ORIGIN

1 tgtggccatc tgcttcccc tgcaactacac cgccatcatg agccccatgc tctgtctgc
 61 cctggtggcg ctgtctctggg tgctgaccac ctccatgcc atgttacaca ctttactcat
 121 ggccaggttg tgttttgcg cagacaatgt gatccccac ttttctgtg atatgtctgc
 181 tctgtgaag ctggcctgct ctgacactcg agtcaatgaa ttggatgat ttatcatggg
 241 agggctgatt ctgtcatcc cattctact catccttggg tctatgcac ggattgtctc
 301 ctccatctc aaggctcctt cgtctaaggg tatctgcaag gcgtctctc ctgtggctc
 361 ccactctct gtgggtgcac tgttctatgg gaccattatt ggtctctact tctgcccac
 421 agctaatagt tctactctaa aggagactgt tatgggtatg atgtacactg tggtgacccc
 481 catgctg (SEQ ID NO:160).

OR103

LOCUS AF179724 478 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA142) gene, partial cds.

ACCESSION AF179724

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.

REFERENCE 1 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..478

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>478

/gene="PPA142"

CDS <1..>478

/gene="PPA142"

/codon_start=2

/product="olfactory receptor"

/translation="VAICKPLNYATIMSQPMCGFLMGVAGILGFVHGGIQTFLIAQLP

FCGPNVIDHFMCDLVPLLELACTDTHTLGPLIAANSGLCFLIFSMLVASVVIILCSL

RTHISEGRHKALSSCTSHIFVVILFFVPCSYLYLRPLTSFPTDKAVTVFCTLFTPML"

(SEQ ID NO:161).

BASE COUNT 93 a 126 c 98 g 161 t

ORIGIN

1 tgtggccatc tgaagccct tgaactatgc aaccatcatg agtcaaccta tgtgtggatt

61 cctgatgggg gtggctggga ttctgggatt tgtgcatgga gggatccaga ctctgttcat

121 agcccagtta ccattctgtg gccccaatgt catcgaccac ttatgtgtg atttagtacc

181 tcttctagag ctggcctgca cagacactca cacctgggg cctctgatag ctgccaacag

241 tggatcattg ttttctctca tttttccat gctgggtgct tcctatgtca tcatcctgtg

301 ctcctaagg actcatatct ctgaaggcgc tcacaaagct ctgtctagtt gtacctctca

361 tatcttgggt gtcattctat tctttgtccc ttgttcatac ctgtatctaa gacctctaac

421 ctccttcccc actgacaaag ctgtgactgt gtttgcacc ctatttacac ctatgttg (SEQ ID NO:162).

OR104

LOCUS AF179725 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA143) gene, partial cds.

ACCESSION AF179725

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Papio hamadryas"

/db_xref="taxon:9557"

gene <1..>487

/gene="PPA143"

CDS <1..>487

/gene="PPA143"

/codon_start=2

/product="olfactory receptor"

/translation="VAICKPLHYLNIMNRRVCTLLVFTSWLVSFLIIFPALMLLLQLD

YCRSNIMDHFTCDYFPLLQLACSDTKFLEVMGFSCAVFTLMLTLALIFLSYIYIIRTI

LRIPSASQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKGVAILNTSVAP

ML" (SEQ ID NO:163).

BASE COUNT 120 a 110 c 85 g 172 t

ORIGIN

1 tgtggccatc tgcaagcctc tgcattactt gaatatcatg aatcgaagag tctgcacact

61 gcttgttttt acttcttggc tggtttcatt cttatcata ttccagcac tcatgttgc

121 ctacagctt gattactgta ggtctaata tatggacat ttacctgtg attatttcc

181 cctgctgcaa ctgcttggc cagacacaaa attcctagag gtgatgggat ttcttgtgc

241 tgtgtttact ctaatgttga cttggcatt aatattctg tcctacatat acattatcag

301 aacaatttg agaattcct ctgctagtca aaggacaaag gcctttcca catgttcttc

361 ccacatgalt gtcattccca tctctatgg cagctgcatt ttatgtaca ttaaacctc

421 agcaaaagat agagtgtcct tgagcaagg agtggaata ctaaaccct cagtagcccc

481 catgctg (SEQ ID NO:164).

OR105

LOCUS AF179726 487 bp DNA PRI 31-DEC-2000

DEFINITION Papio hamadryas olfactory receptor (PPA144) gene, partial cds.

ACCESSION AF179726

KEYWORDS .

SOURCE baboon.

ORGANISM Papio hamadryas

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Papio.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Papio hamadryas"
/db_xref="taxon:9557"
gene <1..>487
/gene="PPA144"
CDS <1..>487
/gene="PPA144"
/codon_start=2
/product="olfactory receptor"
/translation="VAICQPLHYSTLLSPWACMAMVGTSWLTGIITATTHAFLIFSLP
FPSRPIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMIPFSLIVTSYIRILGAI
LAMASTQSRRKVFSTCSSHLLVSLFFGTASITYIRPQAGSSVTTDRVLSLFYTVITP
ML" (SEQ ID NO:165).
BASE COUNT 85 a 184 c 95 g 123 t
ORIGIN
1 tgttgccatc tgccagcctc tgcactactc taccctcttg agcccatggg cctgcatggc
61 catggtgggc acctcctggc tcacaggcat catcacggcc accacccatg ccttctcat
121 cttctctcta cttttccca gccgccaat catccacac ttctctgtg acatcctgcc
181 agtactgagg ctggcaagtg ctgggaagca caggagcgag atctctgtga tgacagccac
241 tgtagtcttc attatgatcc ctttctctct gattgtcacc tttacatcc gcatcctggg
301 agccatccta gcgatggcct ccacccagag ccgccgcaag gtcttctcca cctgctctc
361 ccactctctc gtggtctctc tcttcttgg aacagccagc atcacctaca tccggccgca
421 gccaggtccc tctgttacca cagaccgcgt cctcagtctc ttctacacgg tcatcacacc
481 catgctc (SEQ ID NO:166).

OR106

LOCUS AF179727 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR183) gene, partial cds.
ACCESSION AF179727
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487

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/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene      <1..>487
          /gene="PTR183"
CDS       <1..>487
          /gene="PTR183"
          /codon_start=2
          /product="olfactory receptor"
          /translation="VAICFPLHYTAIMSPMLCLSVVTLVSWVLTTFHAMLHTLLMARLC
          FCADNVIPHFHFCDMSALLKLACSDTRVNEWVIFIMGGLIVVIPFLILGSYARIVSSI
          LKVPSSKGICKALSTCGSHLSVVSIFYGTVIGLYLCPANSSTLKDTVMAMMYTVVTP
          ML" (SEQ ID NO:167).

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BASE COUNT	86 a	137 c	105 g	159 t
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ORIGIN

1 tgtggccatc tgtttccccc tgcactacac cgcccatcatg agccccatgc tctgtctctc
61 cgtgggtgacg ctgtcctggg tctgaccac ctcccatgcc atgttacaca ctttactcat
121 ggccaggttg tgtttttgtg cagacaaatgt gatccccac ttttctgtg atatgtctgc
181 tctactgaag ctggcctgct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
241 agggctcatt gttgtcatcc ctttctact catccttggg tctatgcaa gaattgtctc
301 ctccatcctc aaggctccctt ctctaagggt tatctgcaag gccctgtcta cttgtggctc
361 ccacctgtct gtggtgtcac tgtttctatgg gaccgttatt ggtctctact tatgccatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtagcccc
481 catgctg (SEQ ID NO:168).

OR107

LOCUS AF179728 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR203) gene, partial cds.
ACCESSION AF179728
KEYWORDS .
SOURCE chimpanzee.

SOURCE chimpanzee.

ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi, D.G. and Rouquier, S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES	Location/Qualifiers
----------	---------------------

source 1..487

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/organism="Pan troglodytes"
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/db xref="taxon:9598"

gene <1..>487

/gene="PTR203"

CDS <1..>487

`/gene="PTR203"`

/codon start=2

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/product="olfactory receptor"
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/translation="VAICFPLHYTAIMSPMLCLSVVALSWVLTFHAMLHTLLMARLC
FCADNVIPHFFCDMSALLKLACSDTRVNEWVIFIMGGLIVVIPFLLILGSYARIVSSI
LKVPSKGIKALSTCGSHLSVVSIFYGTVIGLYLCPANSSTLKDTVMAMMYTVVTP
ML" (SEQ ID NO:169).

BASE COUNT 85 a 137 c 106 g 159 t
ORIGIN

1 tgtggccatc tgttccccc tgcaactacac cgccatcatg agcccatgc tctgtctctc
61 cgtggtggcg ctgctctggg tgctgaccac ctccatgcc atgttacaca ctttactcat
121 ggccagggtg tgttttgtg cagacaatgt gatccccac ttttctgtg atatgtctgc
181 tctactgaag ctggcctgct ctgacactcg agttaatgaa tgggtgatat ttatcatggg
241 agggctcatt gttgtcatcc catctactact catcctggg tcctatgcaa gaattgtctc
301 ctccatctc aaggtccctt ctctaaggg tatctgcaag gcctgtcta ctgtggctc
361 ccactgtct gtggtgtcac tgttctatgg gaccgttatt ggtctctact tatgccatc
421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtgacccc
481 catgctg (SEQ ID NO:170).

OR108

LOCUS AF179729 485 bp DNA PRI 31-DEC-2000

DEFINITION Pan troglodytes PTR204 pseudogene, partial sequence.

ACCESSION AF179729

KEYWORDS .

SOURCE chimpanzee.

ORGANISM Pan troglodytes

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..485
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>485
/gene="PTR204"
/pseudo

BASE COUNT 130 a 107 c 77 g 171 t

ORIGIN

1 ttagccata tgtaatccct tgctttatcc agtcatgatg tccaacaaac tcagcgctca
61 gttgctaagc atttcatatg taattgggtt cctgcatcct ctggttcacg tgagtttact
121 attgcgacta actttctgca ggttaacat aatacattat ttctactgtg aaattttaca
181 actgttcaaa atttcatgca atgttccatc tattaacgca ctaatgatat ttattttgg
241 tgcctttata caaataccca cttaaatgac gatcataatc tcttatactc gtgtgctctt
301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gcctticcca catgcagcgc
361 ccatctgctt tctgtctcat tgtactacgg aactctgac ttcatgtatg tgcgtcctgc
421 atctggctta gctgaagacc cagacaaaagt gtattctctt ttacacgatt ataattcccc
481 tgcta (SEQ ID NO:171).

OR109

LOCUS AF179730 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR205) gene, partial cds.
ACCESSION AF179730
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR205"
CDS <1..>487
/gene="PTR205"
/codon_start=2
/product="olfactory receptor"
/translation="VAICRPLCYSTVTRPQVCALMLALCWVLTNIIALHTFLMARLS
FCVTGEIAHFCDITPVLKLSCSDTHINEMMVFLVGGTVLIVPFLCIVTSYIHIVPAI
LRVTRGGVGKAFSTCSSHLCVVCVFYGTLFSAYLCPPSIASEEKDIAAAAMYTIVTP
ML" (SEQ ID NO:172).
BASE COUNT 83 a 148 c 110 g 146 t
ORIGIN

1 tgtggccatt tgccgcccc tctgtactc cacagtcacg aggccccaag tctgtgcctt
61 aatgcttgca ttgtctggg tcctcacaa tatcattgcc ctgactcaca cgttctcat
121 ggctcggttg tcctctgtg tgactgggga aatgctcac ttttctgtg acatcactcc
181 tgtctgaag ctgtcatgtt ctgacacca catcaacgag atgatggttt ttgtcttggg
241 aggcaccgta ctcacgtcc ccttttatg cattgtcacc tctacatcc acattgtgcc
301 agctatcctg aggggtcgaa cccgtggtgg ggtgggcaag gcctttcca cctgcagttc
361 ccacctctgc gttgtttgtg tgtctatgg gacgctcttc agtgcctacc tgtgtctcc
421 ctccattgcc tctgaagaga aggacattgc agcagctgca atgtacacca tagtgactcc
481 catgttg (SEQ ID NO:173).

OR110

LOCUS AF179731 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR206) gene, partial cds.
ACCESSION AF179731
KEYWORDS .
SOURCE chimpanzee.

ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR206"
CDS <1..>487
/gene="PTR206"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYSTIMALRLCASLVAAPWVIAILNPLLHTLMM AHLH
FCSDNVIIHFFCDINSLPLSCSNTSLNQLSVLATVGLIFVVPVCILVSYILIVSAV
MKVPSAQGKLKAFSICGSHLALVILFYGAITGVYMSPLSNHSTEKDSAASVIFMVVAP
VL" (SEQ ID NO:174).

BASE COUNT 90 a 138 c 91 g 168 t

ORIGIN
1 cgtggccatc tgtcaccctt tacattactc caccattatg gccctgcgcc tctgtgcctc
61 tctgttagct gcacctggg tcattgccat ttgaacct ctctgcaca ctcttatgat
121 ggcccatctg cactctgct ctgataatgt tatccaccat ttctctgtg atatcaactc
181 tctctccct ctgtctgtt ccaacaccag tctaatcag ttgagtgtc tggctacggt
241 ggggctgatc ttgtgttac cticagtgtg tatcctggta tctatatcc tcattgtttc
301 tgctgtgatg aaagtccctt ctgccaagg aaaactcaag gctttctcta tctgtggac
361 tcacctgcc ttggtcattc ttctatgg agcaatcaca ggggtctata tgagccctt
421 atccaatcac tctactgaaa aagactcagc cgcatcagtc attttatgg ttgtagcacc
481 tctgttg (SEQ ID NO:175).

OR111

LOCUS AF179732 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR207) gene, partial cds.
ACCESSION AF179732
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR207"
CDS <1..>487
/gene="PTR207"
/codon_start=2
/product="olfactory receptor"
/translation="VAVCNPLLYTVAMYQRLCSLLVATSYCWGRVCSLTLTYFLLLELS
FRGNNIINNPFVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLVITLTSYAFIFITV
MKTASIGGRKKAFFTCASHLTAITIFHGTLFLYCVPNKSSWLMVKVASVFYTVVIP
ML" (SEQ ID NO:176).
BASE COUNT 99 a 122 c 103 g 163 t
ORIGIN
1 tgtggcgggtg tgtaaccctc ttctctacac agttgcaatg taccagaggc ttgtctcctt
61 gttgggtgct acatcatact gttgggggag agtctgttcc ctgacactta cctactttct
121 actggaatta tccttcagag gaaataatat cattaataac ttgtctgtg agcatgctgc
181 cattgttgc tgtcttgc tgcacccta tgtgagccag gagatcactt tagtttctgc
241 cacattcaat gaaataagca gcttggtgat cactctcact tcctatgctt tcatttttat
301 cactgtcatg aagacggcct ccattggggg gcgcaagaaa gcgttctca cgtgtgcctc
361 ccacttgacg gccattacca tttccatgg gactattctt ttctctact gtgttcctaa
421 ctccaaaagt tcgtggctca tggtaaggt ggcctctgtc ttttacacag tggctattcc
481 catgctg (SEQ ID NO:177).

OR112

LOCUS AF179733 481 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR208) gene, partial cds.
ACCESSION AF179733
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 481)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 481)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..481
 /organism="Pan troglodytes"

99

/db_xref="taxon:9598"
gene <1..>481
/gene="PTR208"
CDS <1..>481
/gene="PTR208"
/codon_start=2
/product="olfactory receptor"
/translation="LAICQPLRYPVLMNGRLCTVLVAGACVAGSMHGSIQATLTFRLP
YCGPNQVDYFICDIPAVLRLACADTTVNELVTFVDVGVVAASCFMLILLSYANIVNAI
LKIRTTDGRHRAFSTCGSHLIVTVYYVPCIFIYLRAGSKGPLDGAAAVFYTVVTPLL"

(SEQ ID NO:178).

BASE COUNT 85 a 141 c 124 g 131 t
ORIGIN

1 cctggcaata tgtcagcccc tgcgctaccc agtgctcatg aatgggaggt tatgcacagt
61 cctgtggct ggagcttgtg tgcgggctc catgcatggg tctatccagg ccaccctgac
121 ctccgcctg ccctactgtg ggcccaatca ggtggattac ttatctgtg acatccccgc
181 agtattgaga ctggcctgtg ctgacacaac tgtcaatgag ctgtgacct ttgtggacgt
241 cggggtgggt gccgccagt gcttcatgtt aattctgtc tcgtatgcca acatagtaaa
301 tgccatctg aagatacgca cactgatgg gaggcaccgg gccttctcca cctgtggctc
361 ccactaatc gtggtcacag tctactatgt cccctgtatt tcatctacc ttagggctgg
421 ctccaaaggc cccctggatg gggcggcggc tgtgtttac actgtgtca ctccattact
481 g (SEQ ID NO:179).

OR113

LOCUS AF179734 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR209) gene, partial cds.
ACCESSION AF179734
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR209"
CDS <1..>487
/gene="PTR209"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLYRIVNPRLCGLLVLVSWFLSLSYSLLIQSLMLQVS"

FCTSWVIQHFYCELAQVLTLTCS DTHVNYILLYVVTGLLDFVPFSGILFSYTQIVSYI

LRISSTDGKHKAFSTCGSHLFVVSLFYGTGLGVYLSSNASSSSWWGMVASVMYTVVTP

ML" (SEQ ID NO:180).

5 BASE COUNT 79 a 144 c 107 g 157 t

ORIGIN

1 cgtggccatc tgtaccccc tgtactaccg tgcatcgtg aacccccgcc tctgtggcct
61 gctgggtctt gtgtcctggt tctcagctt gtcatactcc ctgatccaga gtctgtgat
121 gctgcagggt tcttctgta ccagtgggt cattcagcac ttctactgtg agcttgctca
10 181 ggtctcagc cttactgct cagacacaca cgtaattac atcctgctgt acgtggtgac
241 tggcctctg gactttgtc cttctcagg gatcctttc tctacaccc aaattgtctc
301 ctacatccta agaattcat ccacagatgg gaaacacaaa gcctttcta cctgtggatc
361 tcactgttt gtggtttctt tattctatgg gacaggcctt ggtgtgtatc ttagtccaa
421 tgcacgtgcc tcttctggtt ggggcatggt ggcctcggtc atgtacactg tggtcacccc
15 481 catgctg (SEQ ID NO:181).

OR114

LOCUS AF179735 487 bp DNA PRI 31-DEC-2000

20 DEFINITION Pan troglodytes olfactory receptor (PTR210) gene, partial cds.

ACCESSION AF179735

KEYWORDS .

SOURCE chimpanzee.

ORGANISM Pan troglodytes

25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pan.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

40 /organism="Pan troglodytes"

/db_xref="taxon:9598"

gene <1..>487

/gene="PTR210"

CDS <1..>487

45 /gene="PTR210"

/codon_start=2

/product="olfactory receptor"

/translation="VAICNPLLYPVMMSNKL SAQLLSISYVIGFLHPLVHVSLLLRLT

FCRFNIIHYFYCEILQLFKISCNGPSINALMIFGAFIQIPTLMTIIISYRVLFDI

LKKKSEKGRSKAFSTCSAHL LSVSLYYGTLIFMYVRPASGLAEDPDKVYSLFYTIIP

50 LL" (SEQ ID NO:182).

BASE COUNT 129 a 107 c 78 g 173 t

ORIGIN

1 ttagccata tgaatccct tgctttatcc agtgatgatg tccaacaaac tcagcgctca

61 gttgctaagc atttcatatg taattgggtt cctgcatcct ctggttcatg tgagtttact

OR116

LOCUS AF179737 487 bp DNA PRI 31-DEC-2000
DEFINITION Pan troglodytes olfactory receptor (PTR212) gene, partial cds.
ACCESSION AF179737
KEYWORDS .
SOURCE chimpanzee.
ORGANISM Pan troglodytes
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pan.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Pan troglodytes"
/db_xref="taxon:9598"
gene <1..>487
/gene="PTR212"
CDS <1..>487
/gene="PTR212"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVSWILSCASSLSHTLLLTRLS
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKALSTCGSHLSVVSLLYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:186).
BASE COUNT 87 a 141 c 105 g 154 t
ORIGIN
1 tgttgccata tgtcacctc tccactacac tgtcatcatg aggggaagagc tctgtgtctt
61 cttagtggct gtatcttga ttctgtcttg tgccagctcc ctcttcaca ccttctcct
121 gacccggctg tctttctgtg ctgcgaacac catcccccatt gtcttctgtg accttgcctgc
181 cctgtcctga ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggctg attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
301 caccatcctg aggggtccct caaccaaagg gatccacaaa gcattgtcca catgtggctc
361 ccatctctct gtggtgtctc tctattatgg gtcaatatt ggccagtacc tttcccgac
421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacgg tggtcacac
481 catgttg (SEQ ID NO:187).

OR117

LOCUS AF179738 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar HLA121 pseudogene, partial sequence.
ACCESSION AF179738
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..484
15 /organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>484
/gene="HLA121"
/pseudo

20 BASE COUNT 88 a 145 c 118 g 133 t
ORIGIN
1 tgtgctatc tgcctgccgc ttaggtatcc agagctcatg agtgggcaga cctgcattgca
61 gatggcagca ctgagctggg ggacaggctt tgccaactca ctgctacagt ccatccttgt
121 ctggcgccctc cctttctgtg gccacaacgt catcaaccac tttttctgtg agatcttggc
25 181 agtgctaaaa ctggcctgtg gggacatctc cctcaatgcg ctggcattaa tggtgggccac
241 agctgtctctg acactggccc ccctcttctg catctgcctg tcttacctt teatcttgc
301 tgccatcctt agggtagcct ctgctgcagg cggcgcaaaa gccttctcca cctgtctcagc
361 ccacctcaca gtggtggtgg tttttaagg gacaatttc tcatgtact tcaaacccaa
421 ggccaaggac cccaacgtgg ataagattgt tgcattgttg tatggggttg tgacaccctc
30 481 gctg (SEQ ID NO:188).

OR118

35 LOCUS AF179739 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA122) gene, partial cds.
ACCESSION AF179739
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"

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/db_xref="taxon:9580"
gene      <1..>487
          /gene="HLA122"
CDS       <1..>487
          /gene="HLA122"
          /codon_start=2
          /product="olfactory receptor"
          /translation="VAVCNPLLYTVAMSQLCSLLVATSYSWGIVCFLTLTYFLELS
FRGNNIINNfVCEHAAIVAVSCSDPYVSQEITLVSATFNEISSLMMIFTSYAFIFITV
MKMPSTGGRKKAfstCASHLTAITIFHGtILFPYCVpNSKSSWLMVKVTSVFYTVFIP
MV" (SEQ ID NO:189).

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BASE COUNT 101 a 124 c 97 g 165 t
ORIGIN

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1 tggggcgtg tgtaaccctc ttctctacac agttgcaatg tccagaggc ttgtctcct
61 gttggtggtc acatcatact ctgggggat agtctgttc ctgacctta cctactttct
121 actggaatta tccttcagag gaaataatat cattaataac ttgtctgtg agcatgctgc
181 cattgttgc gtgtcttgc ctgacccta tgtgagccag gagatcact tagtttctgc
241 cacattcaat gaaataagca gtctgatgat gatttcact tcctatgctt tcatTTTTat
301 cactgtcatg aagatgcctt ccactggggg gcgcaagaaa gcgttctcca cgtgtgcctc
361 ccactgacc gccattacca tttccatgg gactatcctt tcccctact gtgttctaa
421 ctccaaaagt tcattgctca tggtaaggt gacctgtgc tttacacag tgttcattcc
481 catggtg (SEQ ID NO:190).

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OR119

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LOCUS  AF179740 486 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA123) gene, partial cds.
ACCESSION AF179740
KEYWORDS .
SOURCE  common gibbon.
        ORGANISM Hylobates lar
                Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
                Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 486)
AUTHORS  Giorgi,D.G. and Rouquier,S.P.
TITLE    The olfactory receptor gene repertoire in primates and mouse:
        Evidence for reduction of function in primates
JOURNAL  Unpublished
REFERENCE 2 (bases 1 to 486)
AUTHORS  Giorgi,D.G. and Rouquier,S.P.
TITLE    Direct Submission
JOURNAL  Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
        1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES             Location/Qualifiers
     source            1..486
                       /organism="Hylobates lar"
                       /db_xref="taxon:9580"
     gene              <1..>486
                       /gene="HLA123"
     CDS                <1..>486
                       /gene="HLA123"
                       /codon_start=2
                       /product="olfactory receptor"
                       /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS

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FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIIGLYFLPPSSNTNDKNIIASVIYTVVTP
M" (SEQ ID NO:191).

BASE COUNT 95 a 144 c 93 g 154 t

ORIGIN

1 tgtggccatc tgtcacccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgggtggct gggctcctggg tcacgcttg tgcgtgtgct ctttgcata ccctcctcct
121 ggcccagctt tccttttgg ctgaccacat catccctcac ttctctgtg accttggtgc
181 cctgctcaag ttgctcgtc cagatacctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgcttc cattctgtg catcctggtt tcttatggtc acattggggg
301 caccatctc cagattccct ctaccaaggg catatgcaaa gcctgtcca cttgtggatc
361 ccactctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgtt (SEQ ID NO:192).

OR120

LOCUS AF179741 487 bp DNA PRI 31-DEC-2000

DEFINITION Hylobates lar olfactory receptor (HLA124) gene, partial cds.

ACCESSION AF179741

KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Hylobates lar"

/db_xref="taxon:9580"

gene <1..>487

/gene="HLA124"

CDS <1..>487

/gene="HLA124"

/codon_start=2

/product="olfactory receptor"

/translation="VAICSPLHYPVIMNQRTRAKLAAASWFGFPVATVQTTWLFSFP

FCGTNKVNHFFCDSPVLRVLCADTALFEIYAIVGTILVVMIPCLLILCSYTHIAAAI

LKIPSAKGKNKAFSTCSSHLLVVSIFYISLSLTIFRPKSNNSPGKKLLSLSYTVVTP

ML" (SEQ ID NO:193).

BASE COUNT 102 a 141 c 96 g 148 t

ORIGIN

1 tgtggccatc tgtatccct tgcactaccc agtcacatg aaccaaagga ctctgtccaa
61 actggctgct gcctcctggt tcccagctt tctgtagct actgtgcaga ccacatggct
121 cttcatttt ccattctgtg gcaccaacaa ggtaaaccac ttctctgtg acagcccgcc

5 181 tgtgctgagg ctggtctgtg cagacacagc actgtttgag atctacgcca tcgtcggaac
 241 cattctgggtg gtcgatgcc ctgcttgcct gatcttctgt tctatactc acattgctgc
 301 tgccatcctc aagatcccat cggctaaagg gaagaataaa gccttctcta cgtgttcctc
 361 acacctcctt gttgtctctc ttctctatat atcattaagc ctcacatatt ttcggcctaa
 421 atcaataat tctcctgagg gcaagaagct gctatcattg tctacactg ttgtgactcc
 481 catgttg (SEQ ID NO:194).

OR121

10 LOCUS AF179742 487 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA125) gene, partial cds.
 ACCESSION AF179742
 KEYWORDS .
 SOURCE common gibbon.
 15 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 30 source 1..487
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>487
 /gene="HLA125"
 35 CDS <1..>487
 /gene="HLA125"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYLNIMNRRVCILLVFTSWLISFLIIFPALMLLLKLD
 YCRSNIIDHFTCDYFPLLQLACSDTKFLEVMAFSCAVFTLMFTLALISLSYIYIIRTI
 40 LRIPSTSQRTKAFSTCSSHMVVISISYGSCIFMYIKPSAKDRVLSKGVAILNTSVAP
 MM" (SEQ ID NO:195).
 BASE COUNT 121 a 107 c 82 g 177 t
 ORIGIN
 45 1 tgtggccatc tgcaagcctc tgcattactt gaatatcatg aatcgaagag tctgcatact
 61 gctgttttt acttcttggc tgatttcatt cttaatcata ttccctgcac tcatgttgct
 121 cttaaagctt gattactgta ggtctaatat tattgaccat ttacctgtg attatttcc
 181 cctgctgcaa ctgcttgggt cagacacaaa attcttagag gtgatggcat ttcttctgc
 241 tgtgtttact ctaatgttca ctttggcatt aatatctctg tctacatat acattatcag
 301 aacaattttg agaattcctt ctactagtca gaggacaaag gcctttcca catgttcttc
 50 361 ccacatgggt gtattttcca tctcttatgg cagctgcatt ttatgtaca ttaaaccctc
 421 agcaaaagat agagtgtcct tgagcaaggg agtggcaata ctaaaccct cagtagcccc
 481 catgatg (SEQ ID NO:196).

OR122

LOCUS AF179743 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA126) gene, partial cds.
ACCESSION AF179743
KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Hylobates lar"

/db_xref="taxon:9580"

gene <1..>484

/gene="HLA126"

CDS <1..>484

/gene="HLA126"

/codon_start=2

/product="olfactory receptor"

/translation="VAICHPLHYTVIMREELCVFLVAISWILSCASSLSHTLLLTRLS

FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMFCILVSYGYIGATI

LRVPSTKGIHKASTCGSHLSVVSLYYGSIFGQYLFPTASSIDKDVIVAVMYTVITPM

L" (SEQ ID NO:197).

BASE COUNT 88 a 143 c 104 g 149 t

ORIGIN

1 tgttgccata tgtcaccctc tccactacac tgtcatcatg aggggaagagc tctgtgtctt

61 cttagtggtc atattcttga ttctgtcttg tgccagctcc ctcttcaca ccttctcct

121 gacccggctg tctttctgtg ctgcgaacac catccccac gtcttctgtg acctgtctgc

181 cctgtcctga ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg

241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc

301 caccatcctg aggggtccctt caaccaaagg gatccacaaa gcgccacgt gtggctccca

361 tctttctgtg gtgtctctct attatgggtc aatatttggc cagtacctt tcccgaccgc

421 aagcagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat

481 gttg (SEQ ID NO:198).

OR123

LOCUS AF179744 487 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA127) gene, partial cds.
ACCESSION AF179744
KEYWORDS .

SOURCE common gibbon.

ORGANISM Hylobates lar

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Hylobates lar"
/db_xref="taxon:9580"
gene <1..>487
/gene="HLA127"
CDS <1..>487
/gene="HLA127"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYATIMSQSQCVM LVAGSWVIACACALLHTLLLAQLS
FCADHIIPHFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSICGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:199).

BASE COUNT 95 a 143 c 94 g 155 t

ORIGIN
1 tgtggccatc tgcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgggtggc gggctcctggg tcacgccttg tgcgtgtgct cttttgcata cctctcctc
121 ggccagcgtt tcctttgtg ctgaccacat catccctcac ttcttctgtg acctgggtgc
181 cctgctcaag ttgtcctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
241 attgacagcc attatgctc cattcttgtg catcctgggt tcttatggtc acattggggt
301 caccatcctc cagattcctc ctaccaaggg catatgcaaa gccttgcca ttgtggatc
361 ccacctctca gtgggtgacta tctattatgg gacaattatt ggtctctatt ttctcccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:200).

OR124

LOCUS AF179745 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA128) gene, partial cds.
ACCESSION AF179745
KEYWORDS .
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.

REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
5 FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"
10 gene <1..>484
/gene="HLA128"
CDS <1..>484
/gene="HLA128"
/codon_start=2
/product="olfactory receptor"
15 /translation="VAICHPLHYTVIMREELCVFLVAVSWILSCASSLSHTLLLTRL
FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMFCILVSYGYIGATI
LRVPSTKGIHKASTCGSHLSVVSLLYYGSIFGQYLFPTASSIDKDVIVAVMYTVITPM
L" (SEQ ID NO:201).

BASE COUNT 87 a 143 c 105 g 149 t
20 ORIGIN
1 tgttgccata tgtcacctc tccactac tgatcatg agggagagc tctgtgtt
61 cttagtggtc gtatttga ttctgttg tgccagctcc ctctctaca ccctctct
121 gaccggctg tctttctg ctgcgaac catccccac gtttcttg acctgtctg
181 cctgctcaag ctgtctgct cagatatct cctcaatgag ctggcatgt tcacagtagg
25 241 gggtgtgtg attacctgc cattcatgt tatctggta tcatatggc acattggggc
301 caccatcctg agggctcctt caacaaagg gatccacaaa gcgtccacgt gtggtccca
361 tctttctg gtgtctct attatgggc aatattggc cagtacctt tccgaccgc
421 aagcagttc attgacaagg atgtcattgt ggctgtcatg tacacagta tcacacccat
30 481 gttg (SEQ ID NO:202).

OR125

LOCUS AF179746 484 bp DNA PRI 31-DEC-2000
DEFINITION Hylobates lar olfactory receptor (HLA129) gene, partial cds.
35 ACCESSION AF179746
KEYWORDS
SOURCE common gibbon.
ORGANISM Hylobates lar
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
40 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
45 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Hylobates lar"
/db_xref="taxon:9580"

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gene      <1..>484
          /gene="HLA129"
CDS       <1..>484
          /gene="HLA129"
          /codon_start=2
          /product="olfactory receptor"
          /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS
          FCADHIIPHFFCDLGALLKLSCSDTFLNELVMFTVGVVVITLPMCILVSYGYIGATI
          LRVPTKGIIHKASTCGSHLSVVSLYYGSIFGQYLFPTASSIDKDVIVAVMYTVITPM
          I." (SEQ ID NO:203).

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BASE COUNT	85 a	139 c	111 g	149 t
------------	------	-------	-------	-------

ORIGIN

1 tgtggccatc tgtcacccct tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgggtgct gggctctggg tcatcgcttg tgcgtgtgct cttttgcata cctctctcct
121 ggccagcgtt tctttttgtg ctgaccacat catccctcac ttctctgtg accttgggtgc
181 cctgtctaaag ttgtctgtct cagatacctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtgggtggtc attaccctgc catcattatg tatcttggtg tcatatggct acattggggc
301 caccatctg aggggtccct caaccaaaagg gatccacaaa gcgtccacgt gtggctccca
361 tctttctgtg gtgtctctct attatgggtc aatatttggc cagtaccitt tcccgaccgc
421 aagcagttcc attgacaagg atgtcattgt ggctgtcatg tacacagtga tcacacccat
481 gttg (SEQ ID NO:204).

OR126

LOCUS AF179747 486 bp DNA PRI 31-DEC-2000

DEFINITION Hylobates lar HLA130 pseudogene, partial sequence.

5 181 ctgctcaagt tgtctgctc agatactcc ctcaatcagt tggcaatctt tacagcagga
 241 ttgacagcca ttatgcttcc attctgtgc atctggttt ctatgggtca cattgggggc
 301 accatcctcc agattccctc taccaagggc atatgcaaag ccttgccat ttgtggatcc
 361 caccctcag tggtgactat ctattatggg acaattattg gtctctattt tcttcccca
 421 tccagcaaca ccaatgacaa gaacataatt gcttcagtga tatacacagt agtcactccc
 481 atgttg (SEQ ID NO:205).

OR127

10 LOCUS AF179748 487 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA131) gene, partial cds.
 ACCESSION AF179748
 KEYWORDS .
 SOURCE common gibbon.
 15 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 30 source 1..487
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 gene <1..>487
 /gene="HLA131"
 35 CDS <1..>487
 /gene="HLA131"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICRPLYYPVIMKPHLCGLLVLSWFLSLSYSLLMLRVS
 FCTSWVIQHFYCELAQVLTACSDTHINYILLYMVTGLLGFVPFSGILFSYTQIVSSI
 40 LRISSPDGKHKAFSTCGSHLSVVSFLFYGTGLGVYLSSNASSSSWRGMVASVMYTVVTP
 NV" (SEQ ID NO:206).
 BASE COUNT 80 a 145 c 106 g 156 t
 ORIGIN
 45 1 tgtggccatc tgtgcccc tgtactacc tgtcatcatg aaacctcacc tctgtggcct
 61 gctggttctt gtgtctctgt tctcagctt gtcatactcc ctgatccaga gtctgttgat
 121 gctgcggttg tcttctgca ccagtggtg cattcagcac ttctactgtg agcttgctca
 181 ggtctcagc ctgctctgt cagacacaca catcaattac atctgtctct acatgggtgac
 241 cggccttttg ggctttgtgc cttctcagg gatcctttt tctacaccc aaatcgtctc
 50 301 ctccatctg agaatctcat cccagatgg gaaacacaaa gccttttcta cctgtggatc
 361 tcactctgtc gtggtttctt tattctatgg gacaggtctt ggcgtgtatc ttagtccaa
 421 tgcacgtcc tcttctggc ggggcatggt ggcttcggta atgtacactg tggtaacccc
 481 caatgtg (SEQ ID NO:207).

OR128

LOCUS AF179749 487 bp DNA PRI 31-DEC-2000
 DEFINITION Hylobates lar olfactory receptor (HLA132) gene, partial cds.
 5 ACCESSION AF179749
 KEYWORDS .
 SOURCE common gibbon.
 ORGANISM Hylobates lar
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 10 Eutheria; Primates; Catarrhini; Hylobatidae; Hylobates.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 15 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Hylobates lar"
 /db_xref="taxon:9580"
 25 gene <1..>487
 /gene="HLA132"
 CDS <1..>487
 /gene="HLA132"
 /codon_start=2
 30 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLLAQLS
 FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
 LQTPSTKGICKALSICGSHLSVVVTIYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
 ML" (SEQ ID NO:208).
 35 BASE COUNT 95 a 144 c 94 g 154 t
 ORIGIN
 1 tgtggccatc tgcaccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
 61 gctggtggtc gggctctctggg tcatcgcttg tgcgtgtgct cttttgcata cctctctcct
 121 ggcccagctt tctttttgtg ctgaccacat catccctcac ttctctgtg accttggtgc
 40 181 cctgctcaag ttgtctgct cagatacctc cctcaatcag ttggcaatct ttacagcagg
 241 attgacagcc attatgcttc cattctgtg catcctggtt tcttatggc acattggggt
 301 caccatcctc cagactcctc ctaccaaggg catatgcaaa gccttgcca ttgtggatc
 361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
 421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
 45 481 catgttg (SEQ ID NO:209).

OR129

LOCUS AF179750 487 bp DNA PRI 31-DEC-2000
 50 DEFINITION Gorilla gorilla olfactory receptor (GGO100) gene, partial cds.
 ACCESSION AF179750
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>487
/gene="GGO100"
CDS <1..>487
/gene="GGO100"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTFIMDQNTCIQLAVISWSSSFLCSMVINVLTLSP
YCGPNILNHFFCEVPTVLRSLCTDTSFTLVVFIFSIHVFIPFLIVVSYVRILQSV
LRMRSASGRYKALSTCTSHLTVVTLFYGTAILMYMRPQSRSSWAGGKIIAVFYTVVTP
ML" (SEQ ID NO:210).

BASE COUNT 91 a 130 c 97 g 169 t

ORIGIN
1 ttagccatt tgcacctc ttcatatc ctccattg gacaaaaca cctgcattca
61 actggcagtt atttcttggc ccagtagctt cctgtgtcc atggttca atgtctcac
121 gttgagtttg cctactgtg ggcctaata cctgaatcac ttttctgtg aggtacctac
181 tgcctgagg ttgtcttga ccgacacctc attcacggag ctggtgttt ttatcttcag
241 tatcatcatt gtctcatcc ctttctctc cattgttgtt tctatgtcc ggatcctca
301 atctgttctc aggatgcggt cagcctccgg gcggtataag gcattatcca cctgtacctc
361 ccatttgaca gtggtaacct tattttatgg gactgccatc ctcattgaca tgagaccaca
421 gtcgaggtct tctgggctg gcggcaagat cattgcggtt ttacacgg tggcacacc
481 catgctt (SEQ ID NO:211).

OR130

LOCUS AF179751 488 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla GGO101 pseudogene, partial sequence.
ACCESSION AF179751
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>488
 /gene="GGO101"
 /pseudo

BASE COUNT 91 a 144 c 113 g 140 t

ORIGIN

1 ttgtggccatt agccaccac ttactatcc catcctcatg aatcagaggg tctgtctcca
 61 gattaccggg agctcctggg cctttgggat aatcgatggc ttgatccag atggtggtag
 121 taatgaattt ccctactgt ggcttgagga aggtgaacca ttcttctgt gagatgctat
 181 cctgttgaa gctggcctgt gtagacacat ccctgttga gaagtgata ttgcttgct
 241 gtgtcttcat gcttctctc ccattctcca tcactgtggc ctctatgct cgcattctag
 301 ggactgtgct gcaaatgcac tctgtcagg cctggaaaaa ggccctggcc acctgtcct
 361 cccacctgac agctgtcacc ctcttctatg gggcagccat gtcatctac ctgaggccta
 421 ggcgctaccg ggccccagc catgacaagg tggcctctat ctctacaca gtccttactc
 481 ccatgctg (SEQ ID NO:212).

OR131

LOCUS AF179752 487 bp DNA PRI 31-DEC-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO102) gene, partial cds.
 ACCESSION AF179752
 KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>487
 /gene="GGO102"
 CDS <1..>487
 /gene="GGO102"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VVICHPLHYTVIMREEFCVFLVAVSWILSCASSLSHTVLLTQLS

FCAANTIPHVCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
 LGVPSTKGIHKALSTCGSHLSVVSLLYYGSIFGQYLFPTVSSFIDKDVIVALMYTVVTP
 TL" (SEQ ID NO:213).

BASE COUNT 87 a 137 c 106 g 157 t

ORIGIN

1 tgtgtcata tgcaccctc tccactacac tgcacatcg aggggaagagt tctgtgtctt
 61 ctagtggct gtatttga ttctgttg tgccagctcc ctcttcaca ccgttctct
 121 gaccagctg tctttctg ctgcgaacac catcccccatt gcttctgtg acctgtctgc
 181 cctgctcaag ctgtctctc cagatatctt cctcaatgag ctggctcatg tcacagtagg
 241 ggtggtgctg attaccctgc cattcatgtg tatcctgga tcatatggtt acattggggc
 301 caccatctg ggggtccctt caaccaaagg gatccacaaa gcattgtcca catgtggctc
 361 ccattctct gtggtgtctc tctattatgg gtcaatatt ggccagtacc tttcccgac
 421 tgaagcagt ttattgaca aggatgtcat tgtggctctc atgtacacgg tggtcacacc
 481 cacgttg (SEQ ID NO:214).

OR132

LOCUS AF179753 488 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla GGO103 pseudogene, partial sequence.

ACCESSION AF179753

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 gene <1..>488
 /gene="GGO103"
 /pseudo

BASE COUNT 86 a 149 c 108 g 145 t

ORIGIN

1 tgcggtgtc tgccaccac tccgatatcc cactctcatg agctggcagc tgtgcctgag
 61 gataaccatg ttgtcttggc tctgggtgc agctgacggg ctcatgcagg ctgttctac
 121 cctgagcttc ccatattgct gtgcacacga gatcgatcac ttctctgctg agggccccgt
 181 gctggttcat ttgcttgg ctgacacttc agtcttcgaa aacgcatgt acatctgctg
 241 tgtgttaag ctctgtgtcc cttttccct catctgtcc tctatgttc tcactctgc
 301 tgtgttctg cacatgcct ctacagaagc ccgaagaag gccttgcca cctgtcttc
 361 acatttggct gtggtgggac tctttatgg agctgccatt ttacctata tgagaccac
 421 atccacagc tccactaacc acgataaggt tgtgtcagcc ttctatagta tgttcaccc
 481 ttactaa (SEQ ID NO:215).

OR133

LOCUS AF179754 458 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla GGO104 pseudogene, partial sequence.
ACCESSION AF179754
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 458)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 458)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..458
/organism="Gorilla gorilla"
/db_xref="taxon:9593"
gene <1..>458
/gene="GGO104"
/pseudo
BASE COUNT 89 a 139 c 88 g 142 t
ORIGIN
1 ccaccatcat gagtcacagc cagtgtgtca tgctggtggc tgggtcctgg gtcacgctt
61 gtgcgtgtgc tctttgcat accctctccc tggcccggt ttccttctgt gctgaccaca
121 tcatecctca cttcttctgt gaccttggtg ccctgctcaa gttgtctgc tcagacacct
181 ccctcaatca gttagcaatc ttacagcag gattgacag cattatgctt ccattcctgt
241 gcactctggt ttcttatggt cacattgggg tcaccatcct ccagattccc tctaccaagg
301 gcatatgcaa agccttggtc acttgggat cccacctctc agtggtgact atctattatg
361 ggacaattat tggctctat ttcttcccc catctgcaa caccaatgac gagaacataa
421 ttgcttcagt gatatacaca gtagtcactc ccatattg (SEQ ID NO:216).

OR134

LOCUS AF179755 477 bp DNA PRI 31-DEC-2000
DEFINITION Gorilla gorilla olfactory receptor (GGO106) gene, partial cds.
ACCESSION AF179755
KEYWORDS .
SOURCE gorilla.
ORGANISM Gorilla gorilla
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
REFERENCE 1 (bases 1 to 477)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 477)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..477

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>477

/gene="GGO106"

CDS <1..>477

/gene="GGO106"

/codon_start=2

/product="olfactory receptor"

/translation="VAIRKPLHYLVIMRQWVCVLLVMSWVGGLHSLVQSLIIYGLP

FCGPNVIDHFFCDMYPLLKLVCTDTHVIGLLVVTNGGLSCTIVFLLLLISYGVLHSL

KKLSQKGRQKALSTCSSHITVVVFFVPCIFMYARPARSFIDKSVSVFYTVITPML"

(SEQ ID NO:217).

BASE COUNT 100 a 108 c 100 g 169 t

ORIGIN

1 tgtggccatc cgtaagccct tgcattattt ggttatcatg agacaatggg tgtgtgtgt

61 gctgctggta atgtcctggg ttggaggatt tctgcactca gtattcaac ttagcattat

121 ttatgggctc ccattctgtg gcccgaatgt cattgatcac ttttctgtg acatgtatcc

181 cttattgaaa ctgtgtctgca ctgacacca tgttattggc ctcttagtgg tgaccaatgg

241 aggactgtct tgcactattg tgtttctgct ctactcatc tcttatgttg tcattctgca

301 ctctctaaag aaacttagtc agaaaggag gcaaaaagcc ctctcaacct gcagttccca

361 catcactgtg gttgtctct tcttgttcc ttgtatttt atgtatgcta gacctgctag

421 gagcttcccc attgacaaat cagtgagtgt gtttatata gtcataaccc caatgct (SEQ ID NO:218).

OR135

LOCUS AF179756 488 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla olfactory receptor (GGO107) gene, partial cds.

ACCESSION AF179756

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>488

/gene="GGO107"
 CDS <1..>488
 /gene="GGO107"
 /codon_start=2
 /product="olfactory receptor"
 /translation="LAICYPLHYGAMMSSL SVQLALGSWVCGFMAIAVPTALISGLS
 FCGPRAINHHFFCDIAPWIALACTNTQAVELVAFVIAVVVILSSCLITLVSYVYIIST
 LRIPSASGRSKAFSTCSSHLTVVLIWYGSTIFLHVRTSIKDALDLIKAVHVLNTVVTP
 VL" (SEQ ID NO:219).

BASE COUNT 84 a 155 c 108 g 141 t
 ORIGIN

1 tctgccatc tgcatacct tacatacgg agccatgatg agtagcctgc tctcagtgc
 61 gttggccctg ggcctcctggg ttgtgggtt catggccatt gcagtgccca cagccctcat
 121 cagtggcctg tcttctgtg gccccctgc catcaaccac ttctctgtg acattgcacc
 181 ctggattgcc ctggcctgca ccaacacaca ggcagtagag cttgtggcct ttgtgattgc
 241 ttgtgtggtt atctgagtt catgctcat caccctgtc tctatgtgt acatcatcag
 301 caccatcctc aggatccct ctgccagtgg ccggagcaaa gccttctcca cgtgctcctc
 361 gcattctacc gtggtgctca ttggtatgg gtccacaatt ttcttcacg tccgcacctc
 421 tatcaagac gccttgatc tgatcaaagc tgcacagtc ctgaacactg tggtgactcc
 481 agttttaa (SEQ ID NO:220).

OR136

LOCUS AF179757 480 bp DNA PRI 31-DEC-2000

DEFINITION Gorilla gorilla GGO108 pseudogene, partial sequence.

ACCESSION AF179757

KEYWORDS .

SOURCE gorilla.

ORGANISM Gorilla gorilla

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.

REFERENCE 1 (bases 1 to 480)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 480)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..480

/organism="Gorilla gorilla"

/db_xref="taxon:9593"

gene <1..>480

/gene="GGO108"

/pseudo

BASE COUNT 95 a 125 c 101 g 159 t

ORIGIN

1 tgtggcgggtg tgtaaccctc ttctctacac agtgcaatg tcccagaggc ttgtctcct
 61 gtggtggct acatcatct gttgggggac agtctgtcc ctgacaccta ctttctactg
 121 gaattatcct tcagaggaaa taatatcatt aataacttg tctgtgagca cgctgtcatt
 181 gtgtctgtgt cttgctcga cccctatttg agccaggaga tcaacttagt ttctgccaac

241 attcaatgaa ataagcagcc tggatgatcat tctcacttcc tatgctttca tttttatcac
 301 tgcacatgaag acgccttcca ctggggggcg caagaaagcg ttctccacgt gtgcctccca
 361 cttgacggcc attaccattt tccatgggac tatecttttc ctctactgtg ttctaactc
 421 aagttcgcgg ctcacgtgca aggtggcctc tgccttttgc acagtggta ttcccatgtg (SEQ ID NO:221).

OR137

LOCUS AF179758 487 bp DNA PRI 31-DEC-2000
 DEFINITION Gorilla gorilla olfactory receptor (GGO109) gene, partial cds.
 10 ACCESSION AF179758
 KEYWORDS .
 SOURCE gorilla.
 ORGANISM Gorilla gorilla
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 15 Eutheria; Primates; Catarrhini; Hominidae; Gorilla.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 20 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 25 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Gorilla gorilla"
 /db_xref="taxon:9593"
 30 gene <1..>487
 /gene="GGO109"
 CDS <1..>487
 /gene="GGO109"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSHSQCVM LVAGSWVIACACALLHTLLARLS
 35 FCADHIIPHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
 LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
 ML" (SEQ ID NO:222).
 40 BASE COUNT 95 a 148 c 93 g 151 t
 ORIGIN
 1 tgtggccatc tgcaccctc tacattatgc caccatcatg agtcacagcc agtgtgtcat
 61 gctggtggct gggctctggg tcatcgcttg tgcgtgtgct cttttgcata cctcctcct
 121 ggcccggtt tcttctgtg ctgaccacat catcctcac ttctctgtg accttggtgc
 181 cctgctcaag ttgtctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
 241 attgacagcc attatgcttc cattctgtg catcctgggt tcttatgggc acattggggt
 301 caccatcctc cagattccct ctaccaaggg catatgcaa gcctgttcca cttgtggatc
 361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
 421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
 50 481 catgttg (SEQ ID NO:223).

OR138

LOCUS AF179759 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA1) gene, partial cds.
ACCESSION AF179759
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA1"
CDS <1..>487
/gene="HSA1"
/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYPVMMSNKLSAQLLSISYVIGFLHPLVHVSLLLRLT
FCRFNIIHYFYCEILQLFKISCNGPSINALIIFIGAFIQIPTLMTIIISYTRVLFDI
LKKKSEKGRSKAFSTCGAHLLSVSLYYGTLIFMYVRPASGLAEDQDKVYSLFYTIIP
LL" (SEQ ID NO:224).
BASE COUNT 131 a 105 c 77 g 174 t
ORIGIN
1 tgtagccata tgtaatccct tgctttatcc agtgcgatg tccaacaaac tcagcgctca
61 gttgctaagt atttcatatg taattggttt cctgcacect ctggttcacg tgagtttact
121 attgcgacta actttctgca ggtttaacat aatacattat ttctactgtg aaattttaca
181 actgttcaaa atttcatgca atggtccatc tattaacgca ctaataatat ttatttttgg
241 tgctttata caaataccca cttaaatgac tatcataatc tcttatactc gtgtgctctt
301 tgatattctg aaaaaaaagt ctgaaaaggg cagaagcaaa gccttctcca catgcggcgc
361 ccactctgctt tctgtctcat tgtactacgg aactctgac ttcatgtatg tgcgtcctgc
421 atctggctta gctgaagacc aagacaaagt gtattctctg ttttacacga ttataattcc
481 cctgcta (SEQ ID NO:225).

OR139

LOCUS AF179760 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA10) gene, partial cds.
ACCESSION AF179760
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
/organism="Homo sapiens"
/db_xref="taxon:9606"
gene <1..>487
/gene="HSA10"
CDS <1..>487
/gene="HSA10"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVIMREELCVFLVAVSRILSCASSLSHTLLLTRL
S
FCAANTVPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYIGATI
LRVPSTKGIHKALSTCGSHLSVVSLLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVDTP
ML" (SEQ ID NO:226).

BASE COUNT 87 a 142 c 106 g 152 t

ORIGIN
1 tgttgccata tgtcacctc tccactac tgatcatg aggaagagc tctgtgtt
61 cttagtgct gtatcggg tctgtctg tgccagctc ctctcaca ccttctct
121 gaccggctg tctttctg ctgcgaac cgtccccc gtctctgtg acctgtctg
181 cctgctcaag ctgtctgt cagatatct cctcaatg ctggcatgt tcacagtag
241 ggtggtgctg attaccctgc cattcatgtg tatcctgga tcatatggct acattgggg
301 caccatcctg agggctcct caacaaagg gatcacaaa gcattgtcca catgtggctc
361 ccattctct gtggtgtct tctatttg gtcaatatt ggccagtacc tttcccgac
421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacg tggacacac
481 catgtg (SEQ ID NO:227).

OR140

LOCUS AF179761 487 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens olfactory receptor (HSA12) gene, partial cds.
ACCESSION AF179761
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"

10 gene <1..>487

/gene="HSA12"

CDS <1..>487

/gene="HSA12"

/codon_start=2

/product="olfactory receptor"

15 /translation="VAICFPLHYTAIMSPMLCLALVALSWVLTTFHAMLHTLLMARLC

FCADNVIPHFFCDMSALLKLAFSDTRVNEWVIFIMGGLILVIPFLLILGSYARIVSSI

LKVPSSKGICKALSTCGSHLSVVSIFYGTIVIGLYLCSSANSSTLKDTVMAMMYTVVTP

ML" (SEQ ID NO:228).

BASE COUNT 85 a 141 c 103 g 158 t

20 ORIGIN

1 tgtggccatc tgcttcccc tgcaactac cgccatcatg agcccatgc tctgtctgc

61 cctggggcgc ctgtctggg tgctgaccac ctccatgcc atgttacaca ctctactcat

121 ggccagggtg tgttttggc cagacaatgt gatcccccac ttttctgtg atatgtctgc

181 tctgctgaag ctggcctct ctgacactcg agttaatgaa tgggtgatat ttatcatggg

241 agggctcatt ctgtcatcc cattcctact catcctggg tctatgcaa gaattgtctc

301 ctccatctc aaggctccct ctctaaggg tatctgcaag gccctctcta ctgttgctc

361 ccactgtct gtggtgtcac tgtctatgg aaccgttatt ggtctctact tatgctcatc

421 agctaatagt tctactctaa aggacactgt catggctatg atgtacactg tggtagacccc

481 catgctg (SEQ ID NO:229).

OR141

LOCUS AF179762 486 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens HSA13 pseudogene, partial sequence.

35 ACCESSION AF179762

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>486
/gene="HSA13"
/pseudo

BASE COUNT 108 a 139 c 96 g 143 t

ORIGIN

1 cgtggctgtg tgtaaccccc tcctctatgc catagtcatg acaccaatga cccgcctggc
61 gctgctggcc ggggcatatt ctggcgccat agtcaattct gtgatctgca ctggctgcac
121 cttctctatc tccttctcta agtccaacca ttagacttcc ttttctgtg acctcccacc
181 cctgctgaag ctgctctgta gtgaaaccag gccacgggaa tgggtgatct acctctcagc
241 ttttctggc atcacaacca gcatttcagt gattcttaca tcgtacttgt tcatcattca
301 gtctattctg aagattcgta cagcaggtgg aaagccaaga cttctccac ctgtgcttct
361 cacaagactg cattgactct cttcttggga acactcatat tcataacct gaaaggcaac
421 atgggcgaat cccttgagga agacaagatc gtgtcaatat ttactactgt ggtcatcccc
481 atgcta (SEQ ID NO:230).

OR142

LOCUS AF179763 487 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens HSA16 pseudogene, partial sequence.

ACCESSION AF179763

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>487

/gene="HSA16"

/pseudo

BASE COUNT 111 a 110 c 96 g 170 t

ORIGIN

1 catggccatt gtgaaccctt tactttatag agtagctatg actaaaatag ttgtattgt
61 gctcgcatth gggctcatgta tgggagggtt aatcagctca ttgacacata caattggctt
121 ggtgaaactg tcttctgtg ggccaaatgt catcagtcac ttctctgtg atcttcccc
181 actgttgaag ctgtcatgtt ctgagacatc tatgaatgaa ttgtgcttt tgatcttctc
241 tggcattatt gccacgctca ctttttgac tgggtgatc tctacatct tcattgttgc
301 tgctatctg aggatccgct aagaagcagg tagacgtaaa gccttctcca cctgcacctc
361 tcacctgatt accgtgacct tattctatgg atcgataagc tttagttaca ttacgcaaaa
421 ctcccagtat tccttagaac aagaaaaggt ggtgtctgta tttatacc tggtggttcc
481 tatgta (SEQ ID NO:231).

OR143

LOCUS AF179764 485 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA18 pseudogene, partial sequence.
5 ACCESSION AF179764
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Catarrhini; Hominidae; Homo.
REFERENCE 1 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 485)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..485
/organism="Homo sapiens"
/db_xref="taxon:9606"
25 gene <1..>485
/gene="HSA18"
/pseudo
BASE COUNT 90 a 116 c 106 g 173 t
ORIGIN
30 1 cgtgggcac tgtaaccac tgtgtacac ggtcaccatg tctcccaga agtgtttgct
61 ccttttactg ggtgtctatg ggatggggat ttggggcctg tggctcatat gggaaacata
121 atgtttatgt cttttgtgg agacaacctt gtcaatcact atatgtgtga catccttct
181 ctccttgagc tctcctgcaa cagctcttac ataaattgc tgggtgtttt tattattgtg
241 accgttgcca ttgggggtgc gattgtcacc atttttctct cttatgggtt tattctttcc
35 301 agcattctcc acattagtgc cacagagggc aggtctaaag ccttcagtac ctgcagttcc
361 cacataattg tggatcgct ttcttgggt cagggtcttt catgtacctc aaaccacctt
421 ctattctacc cctggaccag gggaaagtgt cctccatttt ttgtactgct gtggtgccca
481 tgtt (SEQ ID NO:232).

OR144

LOCUS AF179765 486 bp DNA PRI 31-DEC-2000
DEFINITION Homo sapiens HSA2 pseudogene, partial sequence.
45 ACCESSION AF179765
KEYWORDS .
SOURCE human.
ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.
50 REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486
 /organism="Homo sapiens"
 /db_xref="taxon:9606"
 gene <1..>486
 /gene="HSA2"
 /pseudo

BASE COUNT 88 a 117 c 107 g 174 t

ORIGIN

1 cgtgggcatc tgtaaccac tggtgtacac ggtcaccatg tctcccaga tgtgtttgct
 61 ccttttactg gggtgtctatg gggtggggat ttggggcctg tggctcatat gggaaacata
 121 atgtttatgt ccttttgg agacaacct gtcaatcact atatgtgtga catccttct
 181 ctcctgagc cctcctgcaa cagctcttac ataaattgc tgggtgttt tattattgtg
 241 acegttgga tgggggtgcc gattgtcacc atttttct cttatggtt tattcttcc
 301 agcattctcc acattagtc cacagagggc aggtctaaag ccttcagtac ctgcagttcc
 361 cacataatg tggatcgt tttcttgg tcagggtct tcatgtacct caaacacct
 421 tctattctac ccctggacca ggggaaagtg tctccattt ttgtactgc tgggtgccc
 481 atgttt (SEQ ID NO:233).

OR145

LOCUS AF179766 487 bp DNA PRI 31-DEC-2000
 DEFINITION Homo sapiens olfactory receptor (HSA3) gene, partial cds.
 ACCESSION AF179766

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Homo sapiens"
 /db_xref="taxon:9606"
 gene <1..>487
 /gene="HSA3"
 CDS <1..>487
 /gene="HSA3"
 /codon_start=2
 /product="olfactory receptor"

/translation="VAICKPLHYVVMNNRVCTLLVLCCWVAGLMIIVPPLSLGLQLE
 FCDSNAIDHFSCDAGPLLKISCSDTWVIEQMVILMAVFALIITPVCVILSYLYIVRTI
 LKFPSVQQRKKAFSTCSSHMIVVSIAYGSCIFIYIKPSAKDEVAINKGVSVLTTSVAP
 LL" (SEQ ID NO:234).

5 BASE COUNT 114 a 113 c 97 g 163 t

ORIGIN

1 tgtggccatc tgtaaaccce ttcattatgt ggtcatcatg aacaacaggg tgtgtacctt
 61 attagtctc tgctgtggg tggctggctt gatgatcatt gtccaccac tagcttagg
 121 cctccagctc gaattctgtg actccaatgc cattgatcat ttagctgtg atgcaggtec
 10 181 tctcctaaag atctcatgct cagatacatg ggtaatagaa cagatggta tacttatggc
 241 tgtattgca ctcattatca cccagtttg tgtgattctg tctacttgt acatagttag
 301 aacaattctg aagttccctt ctgttcagca aaggaaaaag gccttttcta cctgttcac
 361 ccacatgatt gtggtttcca ttgcctatgg aagctgcac ttcatttata tcaagccctc
 421 tgcaaaagat gaggtggcca taaataaagg agtttcagtt ctactactt ctgtcgcacc
 15 481 ctgttg (SEQ ID NO:235).

OR146

LOCUS AF179767 487 bp DNA PRI 31-DEC-2000
 20 DEFINITION Homo sapiens olfactory receptor (HSA5) gene, partial cds.
 ACCESSION AF179767
 KEYWORDS .
 SOURCE human.

ORGANISM Homo sapiens

25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

30 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"

40 gene <1..>487

/gene="HSA5"

CDS <1..>487

/gene="HSA5"

45 /codon_start=2

/product="olfactory receptor"

/translation="VAICHPLHYTVIMREELCVFLVAVTWILSCASSLSHTLLLTRLS

FCAANTIPHVFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMFMCILVSYGYIGATI

LRVPSTKGIHKALSTCGSHLSVVSLEYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP

50 ML" (SEQ ID NO:236).

BASE COUNT 88 a 141 c 105 g 153 t

ORIGIN

1 tgttgccata tgcaccctc tccactacac tgtcatcatg agggagagac tctgtgtctt

61 cttagtggct gtaacttgga ttctgtcttg tgccagctcc ctctctcaca ccttctcct

121 gacccggctg tctttctgtg ctgcgaacac catcccccat gtcttctgtg accttctgtc
 181 cctgtctcaag ctgtcctgct cagatatctt cctcaatgag ctggctatgt tcacagtagg
 241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acattggggc
 301 caccatcctg agggctccct caaccaaagg gatccacaaa gcattgtcca catgtggctc
 361 ccatctctct gtgggtgtct tctattatgg gtcaatattt ggccagtacc tttcccgcac
 421 tgtaagcagt tctattgaca aggatgtcat tgtggctctc atgtacacgg tggtcacacc
 481 catgttg (SEQ ID NO:237).

OR147

LOCUS AF179768 478 bp DNA PRI 31-DEC-2000
 DEFINITION Homo sapiens HSA6 pseudogene, partial sequence.
 ACCESSION AF179768
 KEYWORDS .
 SOURCE human.
 ORGANISM Homo sapiens
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Homo.
 REFERENCE 1 (bases 1 to 478)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 478)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..478
 /organism="Homo sapiens"
 /db_xref="taxon:9606"
 gene <1..>478
 /gene="HSA6"
 /pseudo
 BASE COUNT 89 a 128 c 103 g 158 t
 ORIGIN
 1 ttgtgccatc tgtaaccctt tgcgctacct tacagtcatg aacccccagc tatgcctttg
 61 gttggttctt gcctgtcgtt gtgggggttt tatccactct atcatgcagg tcatactagt
 121 catccagctg ctttctgtg ggcccaatga actggacaac ttctactgtg atgtcctaca
 181 aatcatcaag ctggcctgca tggacaccta tgtggtagag gtgctggtga tagccaacag
 241 tggctcgtg tctcttctct gcttcttggc ttactattc tcttatgcta tcatcctgat
 301 caccctgaga acacgcttct gccagggccca gaacaaggtc ctctctacct gtgcttctca
 361 cctgacagtg gtcagcctga tcttcgtgcc atgcgtattc atctattga ggcctttctg
 421 cagcttctct gtggataaga tattctcctt gttttacaca gtgattacac ctatgttg (SEQ ID NO:238).

OR148

LOCUS AF179769 488 bp DNA PRI 31-DEC-2000
 DEFINITION Homo sapiens HSA7 pseudogene, partial sequence.
 ACCESSION AF179769
 KEYWORDS .
 SOURCE human.
 ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Homo sapiens"

/db_xref="taxon:9606"

gene <1..>488

/gene="HSA7"

/pseudo

BASE COUNT 95 a 141 c 103 g 149 t

ORIGIN

1 catggccatc tgcaagccct tgttatatgg aagcaaatg accaggtgtg tctgcctctg
61 tctggctgct gctccctata ttatggctt tgcaaatggt ctaagcacag accaccctga
121 tgcttcgtct gtccttctgt ggacccaatg acatcaacca cttttactgt gcggacccac
181 cctcttagt cctgcctgc tcagatactt atgtcaaaga gaccgccatg ttggtggtgg
241 ctggttccaa cctcatttgc tctctaccg tcactcctcat ttctacact ttcatttca
301 ctgccattct gcgtatccac actgctgagg ggaggcgcaa ggccttctcc acctgcgggt
361 ctcatgtgac cgctgtcact gtcttctatg ggacactgtt ctgcatgtac ctgaggcccc
421 cttctgagac atctatacaa caggggaaaa ttgtagctgt tttttatc tttgtgagtc
481 cgatgtta (SEQ ID NO:239).

OR149

LOCUS AF179770 487 bp DNA PRI 31-DEC-2000

DEFINITION Homo sapiens olfactory receptor (HSA8) gene, partial cds.

ACCESSION AF179770

KEYWORDS .

SOURCE human.

ORGANISM Homo sapiens

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Homo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Homo sapiens"

/db_xref="taxon:9606"
 gene <1..>487
 /gene="HSA8"
 CDS <1..>487
 /gene="HSA8"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYTSIMNRKLCTLLVLCAWLSGFLTIFPPLMLLLQLD
 YCASNVIDHFACDYFPLLQLSCSDTWLLEVIGFYFALVTLFTLALVILSYMYIIRTI
 LRIPSASQRKKAFSTCSSHMIVISISYGSCIFMYANPSAKEKASLTKGAILNTSVAP
 ML" (SEQ ID NO:240).

BASE COUNT 115 a 119 c 80 g 173 t
 ORIGIN

1 tgttgcctc tgcaagcccc ttcatcac atccatcatg aacaggaaac tctgcactct
 61 acttgtgctg tgtgcctggc taagtgggtt tctgaccatt tcccacccc ttatgcttct
 121 cctccagctg gattactgtg ctccaacgt cattgatcac ttgcatgtg actattttcc
 181 cctcttaca ctatctgtt cagatacatg gctcctagaa gtaattgggt ttacttttgc
 241 ttgtgtact ttgctgttca cttggcatt agtgatttta tctacatgt acattatcag
 301 gaccattttg agaatcccgt ctgccagtca aagaaaaaag gctttctcca ctgttcttc
 361 tcacatgatt gtcatttcca ttcttatgg aagctgtata tcatgtatg ctaatccatc
 421 tgcaaaagaa aaggcacatc tgacaaaagg aatagctatt ctcaatacat ctgttgcccc
 481 catgctg (SEQ ID NO:241).

OR150

LOCUS AF179771 485 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU145) gene, partial cds.
 ACCESSION AF179771
 KEYWORDS .

SOURCE Eulemur fulvus.
 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

45 source 1..485
 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>485
 /gene="EFU145"
 50 CDS <1..>485
 /gene="EFU145"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICQPLQYSTAMSHQLCALMLAMCWLLTNCPALMHNTLLLTRVA

FCAQRAIPHFYCDPSALLKLACSDTRINELMIAMGLAFLTVPLTLIVFSYVRISWAV
LGISSPGGRCKAFSTCGSHLTVVLLFYGSLMGVYLLPPSSYSTEMERESRAAILYMVIIP
M" (SEQ ID NO:242).

BASE COUNT 78 a 155 c 114 g 138 t

ORIGIN

1 tgtggccatc tgccagccac tccaatacag cacagctatg agtcaccagc tctgtgcact
61 catgctggcc atgtgctggc tgctaacaa ctgtcctgca ttgatgcaca cgctgttgct
121 gaccctgtgt gctttctgtg cccagagggc catccccac ttctactgtg atcccagtgc
181 tctcctgaag ctgcctgct cggatacccg cataaacgag ctgatgatca tcgcatggg
241 cttggccttc ctcacgggtc ccctcacgct gatcgtcttc tctacgtcc gcatctcctg
301 ggctgtgctt ggcatctcgt ctctggagg gcgatgcaa gccttctcca cctgtgggtc
361 tcactctacg gtggttctgc tctctatgg gtctcttatg ggtgtgtatt tgcctcctcc
421 gtcactctac tctacagaga gggaaagcag ggctgccatt ctctacatgg tgatcatcc
481 catgt (SEQ ID NO:243).

OR151

LOCUS AF179772 485 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur fulvus EFU146 pseudogene, partial sequence.

ACCESSION AF179772

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..485

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>485

/gene="EFU146"

/pseudo

BASE COUNT 98 a 145 c 110 g 132 t

ORIGIN

1 cgttgccatc tgcaagcccc tccactaccc ggtgctcatg agcagcaggg tctgcacaca
61 gctcatctc gctgctggc tggcaggggt ctcttcacac attgtgcctg tcactctgac
121 cagtacgtt ccattctgtg acaccacat caaccacttc ttctgtgact atacacctct
181 aatggaggtg gtctgcagtg ggccaaagggt gctggagatg gtggatttta ccttgccctt
241 ggtggcaccg ctcagcacct tgggtctgat caccctgtcc tacatccaga tcacagcac
301 gattgtcagg atccccctg tccaggagag gaaaaaggct ttctccacct gtctctcca
361 tgtcatctgt gttaccatgt gctatggaaa gctgttttt tatgtatgtc aagccctccc
421 caggcaagg ggttgatcta aacaaaggag tgtctctaat caatacagtt attgcccccc
481 tcttg (SEQ ID NO:244).

OR152

LOCUS AF179773 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU147) gene, partial cds.
5 ACCESSION AF179773
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
25 gene <1..>487
/gene="EFU147"
CDS <1..>487
/gene="EFU147"
/codon_start=2
30 /product="olfactory receptor"
/translation="VAICLPLHYTMVMKPRCCLMLVAASWLCSHCLAFSLTLLMTQFS
FCASHSIQHFFCDVPPLLKLACSDTHIFQVTMLTEGVLSGVIPLTCLVLSYAHIMHTI
LRIPSAGGKHKVFSTCGSHLSVVTFLFYGTFLVYFQPSSSYSADTGMVACVVYTMVTP
MV" (SEQ ID NO:245).
35 BASE COUNT 86 a 161 c 93 g 147 t
ORIGIN
1 cgtggccatc tgccttctc tgcactacac catggtcatg aaaccccgat gctgctgat
61 gctgggtggc gcatcctggc tctgctccca ctgcttggt tctctctca cccttctgat
121 gactcagttc tcttctgtg cctccattc catccaacac ttttctgtg atgtaccccc
40 181 actcctcaaa ctgctctgtt cagacacca tatcttcag gtcacaatgt taactgaagg
241 agtcctctca ggtgtgatcc ctcttacctg tgccttggtc tcttatgcc acatcatgca
301 caccatctc aggatccctt ctgctggggg caagcacaaa gtcttctcta cctgtggctc
361 tcactgtca gtggtcactc tcttctatgg gacctctt ctggtgtatt tccagccttc
421 atcctctac tcagcagata ctggaatggt ggcattgtga gtatacacga tggtcacccc
45 481 catggtg (SEQ ID NO:246).

OR153

LOCUS AF179774 487 bp DNA PRI 31-DEC-2000
50 DEFINITION Eulemur fulvus olfactory receptor (EFU148) gene, partial cds.
ACCESSION AF179774
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>487
/gene="EFU148"
CDS <1..>487
20 /gene="EFU148"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYVAIMSNTVCRRLVFCCWVAGLFIIIPPLSLGLNLE
25 FCSDSIDHFICDASPLLNISCSNTWFMEQTVIICAVLTLIMTLMCVVLSYIYIIKTI
LGFSSAQKKKAFSTCSSHMIVVSITYGSYIFIYIKPSAKEEVAINKGVTVLTTSIAP
ML" (SEQ ID NO:247).

BASE COUNT 118 a 118 c 88 g 163 t
ORIGIN
1 tgtggccatc tgcaaacgcg tgcattatgt ggccattatg agtaacacag tctgcagaag
30 61 actgtcttt tgtgttggg tagctggctt gttattata atccctccac ttagcctggg
121 cctaaatctg gaattttgtg attctgatac cattgatcat tttatctgtg atgcatctcc
181 cctcctgaat atctctgtt caaatacttg gttcatggaa cagactgtta tcatctgtgc
241 agtctgacc ctcattatga cacttatgtg ttagttctg tcctacattt atatcatcaa
301 gacaatttta ggattctctt ctgccagca aaagaaaaaa gcctttcca cctgttcttc
35 361 ccacatgatt gtggtgtcca tcacctatgg cagctacatc tcatctata tcaaaccttc
421 tgcaaaggaa gaagtagcca ttaacaaggg tgtgacagtc ctactactt ccacgcctcc
481 catgctg (SEQ ID NO:248).

OR154

40 LOCUS AF179775 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU149) gene, partial cds.
ACCESSION AF179775
KEYWORDS .
45 SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..487

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

10 gene <1..>487

/gene="EFU149"

CDS <1..>487

/gene="EFU149"

/codon_start=2

/product="olfactory receptor"

15 /translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSFLIVFPALMLLLKLD

YCGFNIIDHFTCDYFPLLQLSCSDTKFLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI

LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVLSKAVAVLITSVAP

ML" (SEQ ID NO:249).

BASE COUNT 109 a 113 c 91 g 174 t

20 ORIGIN

1 tgttgctatc tgtaagcccc tgcattacag ggctcatcatg aatcgaagag tctgcacact

61 gctcgtcttt gcctcttgcc tggtttcatt ctaatcgta ttccagcac tcatgttgct

121 cttaaagctt gattactgtg gatttaatat tattgacat ttacctgtg attattttcc

181 cctgtgcgag ctttctggt cagatacaaa attcctggag ataatggggg tttcctgtgc

241 tgtgttact ctaatgttca ctttggcatt aatatttctg tctacatgc acatcgtgag

301 aacgattttg agaattcctt ctactagtca gaggacaaaag gccttttcta catgttttc

361 ccacatgatt gtcactccca tctcttatgg cagctgcatt ttatgtaca ttaagccctc

421 agcaaaggat agagtatctt tgagcaaggc agtggctgtg ctaatcacct cagtagctcc

481 catgctc (SEQ ID NO:250).

OR155

LOCUS AF179776 484 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur fulvus EFU150 pseudogene, partial sequence.

35 ACCESSION AF179776

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Primates; Strepsirhini; Lemnridae; Eulemur.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>484
/gene="EFU150"
/pseudo

BASE COUNT 80 a 157 c 112 g 135 t

ORIGIN

1 tctggctatc tgctatcctc tacactacgg gacaatcatg agcagcctgc tggctgcaca
61 gctggccttg ggctcctggg tctgtggtt cctggccatt gcagtgtga cgcccttat
121 cagtggcctg tccttctgtg gcgcccgtgc catcaatcac ttcttctgtg acattgcacc
181 ctggatgcc ctggcctgta ccagcacaca ggcaatagag ctctggcct ttgtgattgc
241 tttgtggc atcctgagtt catgcctcat caccctggc tcctacgtgt acattatcag
301 caccatcctc aggatcccat ctgccagcgg cggagcaaag ccttctctac gtgctcctct
361 caccacccg tgggtcctcat ctggtatggg tccacgattt ttctcatgt cgcacctcc
421 atcacagacg ccttggatct gaccaaagct gtccatgtcc tgaacaccgt ggtgactcca
481 gttc (SEQ ID NO:251).

OR156

LOCUS AF179777 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU151) gene, partial cds.

ACCESSION AF179777

KEYWORDS .

SOURCE Eulemur fulvus.

ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Eulemur fulvus"

/db_xref="taxon:13515"

gene <1..>487

/gene="EFU151"

CDS <1..>487

/gene="EFU151"

/codon_start=2

/product="olfactory receptor"

/translation="LAICYPLHYRTIMSSLLATQLALGSWVCGLAIAVLTALISGLS

FCGARAINHFFCDIAPWIALACTSTQAIELVAFVIAFVVILSSCLITLVSYYVYIIST

LRIPSASGRSKAFSTCSSHLTVVLIWYGSTIFLHVRTSITDALDLTKAVHVLNTVVTP

VL" (SEQ ID NO:252).

BASE COUNT 83 a 159 c 110 g 135 t

ORIGIN

1 tctggctatc tgctatcctc tacactacag gacaatcatg agcagcctgc tggctacaca
61 gctggccttg ggctcctggg tctgtggtt cctggccatt gcagtgtga cgcccttat
121 cagtggcctg tccttctgtg gcgcccgtgc catcaaccac ttcttctgtg acattgcacc

181 ctggattgcc ctggcctgca ccagcacaca ggcaatagag ctggtggcct ttgtattgc
 241 tttgtggc atcctgagtt catgcctcat caccctggc tcctacgtgt acattatcag
 301 caccatcctc aggatcccat ctgccagcgg ccggagcaaa gccttctcta cgtgctcctc
 361 tcacctcacc gtgggtgctca tctggtatgg gtccacgatt tttctcatg tccgcacctc
 421 catcacagac gccttggatc tgaccaaagc tgtccatgct ctgaacaccg tggtgactcc
 481 agttcta (SEQ ID NO:253).

OR157

10 LOCUS AF179778 487 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur fulvus olfactory receptor (EFU153) gene, partial cds.
 ACCESSION AF179778
 KEYWORDS .
 SOURCE Eulemur fulvus.
 15 ORGANISM Eulemur fulvus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 20 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 30 /organism="Eulemur fulvus"
 /db_xref="taxon:13515"
 gene <1..>487
 /gene="EFU153"
 CDS <1..>487
 35 /gene="EFU153"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYRVIMNRRVCTLLVFASWLVSFLIVFPALMLLLKLD
 YCGFNIIDHFTCDYFPLLQLSCSDTKFLEIMGFSCAVFTLMFTLALIFLSYMHIVRTI
 40 LRIPSTSQRTKAFSTCSSHMIVISISYGSCIFMYIKPSAKDRVSLSKAVAVLITSVAP
 ML" (SEQ ID NO:254).
 BASE COUNT 109 a 113 c 91 g 174 t
 ORIGIN
 1 tgttgctatc tgtaagcccc tgcattacag ggtcatcatg aatcgaagag tctgcacact
 45 61 gctcgtcttt gcctcttggc tggtttcatt cttaatcgta ttccagcac tcatgttgct
 121 cttaaagctt gattactgtg gatttaatat tattgacat ttacctgtg attatttcc
 181 cctgctgcag ctttctgtt cagatacaaa attcctggag ataatggggt tttcctgtgc
 241 tgtgttact ctaatgtca ctttggcatt aatatttctg tctacatgc acatcgtgag
 301 gacgattttg agaattcctt ctactagtca gaggacaaag gccttttcta catgttcttc
 50 361 ccacatgatt gtcactcca tctttatgg cagctgcatt ttatgtaca ttaagccctc
 421 agcaaaagat agagtatctt tgagcaaggc agtggctgtg ctaatcacct cagtagctcc
 481 catgctc (SEQ ID NO:255).

OR158

LOCUS AF179779 488 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur fulvus olfactory receptor (EFU154) gene, partial cds.
5 ACCESSION AF179779
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..488
/organism="Eulemur fulvus"
/db_xref="taxon:13515"
25 gene <1..>488
/gene="EFU154"
CDS <1..>488
/gene="EFU154"
/codon_start=2
30 /product="olfactory receptor"
/translation="MAICHPLRYPVFMNHRVCLFLASGCWFLGSVDGFMLTPITMTFP
YCRSREIHHSFCEVPAVTTLSCSDTSLYEMLMYLCCVLMMLIPVTVISSYSFILLTI
HRMGSAEGRKKAFATCSSHMTVVILFYGAAIYTYMLPSSYHTPEKDMMVSVFYTILTP
VL" (SEQ ID NO:256).
35 BASE COUNT 92 a 163 c 95 g 138 t
ORIGIN
1 catggccatc tgccatccgc tccgttacc tgtcttcacg aaccacaggg tgtgtctctt
61 cctggcatct ggctgctggt tcttgggac agtagatggc ttcagctca ctccaatcac
121 catgaccttc ccctactgca ggtcccggga gattcaccat tcctctgcg aagtcctgc
40 181 tgtaacgacg ctttctgct cagacacctc actctatgaa atgctcatgt acctgtgctg
241 tgtctcatg ctctctatc ctgtgacagt cattcaagc tcctattcat tcattctcct
301 caccatccac aggatgggct cagcagaggg ccggaagaag gcctttgccca cctgttcctc
361 ccacatgacc gtggttatcc ttttctatgg ggccgccatc tacacctaca tgctccccag
421 ctctaccac actcctgaga aggacatgat ggtgtctgtc tttatacca tcctaactcc
45 481 tgtgctaa (SEQ ID NO:257).

OR159

LOCUS AF179780 488 bp DNA PRI 31-DEC-2000
50 DEFINITION Eulemur fulvus EFU155 pseudogene, partial sequence.
ACCESSION AF179780
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..488
15 /organism="Eulemur fulvus"
/db_xref="taxon:13515"
gene <1..>488
/gene="EFU155"
/pseudo

20 BASE COUNT 111 a 113 c 91 g 173 t
ORIGIN
1 tgttgctatc tgtaagcccc tgcattacaa ggatcatcatg aatcgaagag tcgtgcacac
61 tgctcgtctt tgctctttgg ctggtttcat tctaatcgt attcccagca ctcatgttgc
121 tctaaagct tgattactgt ggatttaata ttattgacca tttacctgt gattatttct
25 181 ccctgctgca gctttctgt tcagatacaa aattcctgga gataatgggg ttttctgtg
241 ctgtgtttac tctaatgttc actttggcat taatatttct gtcctacatg cacatcgtga
301 gaacgatttt gagaattctt tctactagtc agaggacaaa ggccttttct acatgttctt
361 cccacatgat tgcacatccc atctcttatg gcagctgcat tttatgtac attaagccct
421 cagcaaagga tagagtatct ttgagcaagg cagtggctgt gctaatacc tcagtagctc
30 481 ccatgcac (SEQ ID NO:258).

OR160

LOCUS AF179781 486 bp DNA PRI 31-DEC-2000
35 DEFINITION Eulemur fulvus EFU156 pseudogene, partial sequence.
ACCESSION AF179781
KEYWORDS .
SOURCE Eulemur fulvus.
ORGANISM Eulemur fulvus
40 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
45 Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
50 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..486
/organism="Eulemur fulvus"

/db_xref="taxon:13515"
 gene <1..>486
 /gene="EFU156"
 /pseudo

5 BASE COUNT 119 a 110 c 93 g 164 t

ORIGIN

1 tgtggccatc tgcaagcccc tgcattatgt gaccgtcatg aacagcagag ttgcaggat
 61 tctcatcatc tgtgttggg tggctggtt atgcataata atccctccac ttagcctggg
 121 tttaaatcta aaattctgtg actctaact gattgatcat ttggttgcg atgcattcc
 10 181 cctggtgaaa atctcatgct cagacacatg gttcatggaa cagacggta tcatctgtgc
 241 tgtgctgacc ctgaatatga ctctaacttg ttagttctg tcatagcgtt acatcatcaa
 301 gacaattttt agattccctt ctgtccagca aaggaaaaag gcctttcca cctgttcttc
 361 ccacatgatt gtggtttcca tcacctatgg cactgtcatt tcatctaca tgaatcctac
 421 agcaaaggaa gaagtgaccg ttaataaagt agtttcttg ctcatttctt ctattttgct
 15 481 acattg (SEQ ID NO:259).

OR161

LOCUS AF179782 486 bp DNA PRI 31-DEC-2000

20 DEFINITION Eulemur rubriventer ERU157 pseudogene, partial sequence.

ACCESSION AF179782

KEYWORDS .

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

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 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Eulemur rubriventer"

40 /db_xref="taxon:34829"

gene <1..>486

/gene="ERU157"

/pseudo

BASE COUNT 78 a 157 c 112 g 139 t

45 ORIGIN

1 cgtggccatc tgccagccac cccaatacag cacagctatg agtccccagc tctgtgcact
 61 catgctggcc atgtgctggc tgctaaccag ctgtctgctg ttgatgcaca cgctgttgc
 121 gaccctgtg gctttctgtg cccagaaggc catccccac ttctactgtg atcccagtgc
 181 tctctgaag ctgcctgct cggataccg cataaatgag ctgatgatca tcgcatggg
 50 241 ctgacgttc ctactattc cctcacact gatcgtcttc tctacgttc gcatctctg
 301 ggctgtgctt ggcactcgt ctctggcgg gcgatgcaag gccttctcca cctgtgggtc
 361 tcatctcag gtggttctgc tcttctatgg gtctctatg ggtgtgtatt tgcttctcc
 421 gtcatcttac tctacagaga gggaaagcag gctgccattc tctacatggt gatcattccc
 481 atgtta (SEQ ID NO:260).

OR162

LOCUS AF179783 484 bp DNA PRI 31-DEC-2000
5 DEFINITION Eulemur rubriventer ERU159 pseudogene, partial sequence.
ACCESSION AF179783
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
10 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
15 Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 484)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
20 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..484
/organism="Eulemur rubriventer"
25 /db_xref="taxon:34829"
gene <1..>484
/gene="ERU159"
/pseudo
BASE COUNT 123 a 103 c 94 g 164 t
30 ORIGIN
1 tgtggccatc tgcaaccac tgaggatcc catcatcatg aacagggtgt tataagtgc
61 aatggctgca tggcttgga tcataggcta tctgatctcc ttagtgcaa cagtcttgac
121 aatgatattg cctttctgtg gcaataatgt cattgatcat attacctgtg agatcctggc
181 tcttaaactc atatgctcag atatttccat gaatgtgctt atcatggcag tggcaagtat
35 241 tgttatattg gtgattcctc tctgttcat tttatctcc tatgtattca tcctctctc
301 catcctgaga attaattctt ctgaggggag aaagaaagcc ttgcaacct gttcagccca
361 cctgactgtg gtcattctat tctatgggtc agctctttt atgtacatga agcctaagtc
421 aaagtacaca aaagtatctg atgaaatcat tgcactgtct tacggagtag taaccccaat
481 gttg (SEQ ID NO:261).

OR163

LOCUS AF179784 487 bp DNA PRI 31-DEC-2000
45 DEFINITION Eulemur rubriventer olfactory receptor (ERU160) gene, partial cds.
ACCESSION AF179784
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
50 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
5 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
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gene <1..>487
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CDS <1..>487
15 /gene="ERU160"
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/product="olfactory receptor"
/translation="VAICHPLHYTTIMREELCTLLVAISWLLSCASSLSHTLLLTRLS
FCAANVIPNFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFLCILVSYGYIGATI
LRVPSTKGICKALSTCGSHLSVVSLLYYGAIFGQYLPALSNSIDKDIIVAMMYTVVTP
20 ML" (SEQ ID NO:262).
BASE COUNT 91 a 143 c 104 g 149 t
ORIGIN
1 tgttgccata tgtcaccctc tcactacac caccatcatg aggggaagagc tctgcacctt
61 attggtggct atactctggc tcctgtcttg tgccagctcc ctctcccaca cccttctcct
25 121 gaccgggctg tccttctgtg ctgctaattg cattcccaac ttcttctgtg acctgtctgc
181 tctgtcgaag ctgtcctgct cagacatctt cctcaatgag ctggatcatg ttacagtagg
241 ggtggtggtc attacctgac cattcttatg tatcttggtg tcttacggct acattggggc
301 caccatcctg agggtcctt caaccaaagg gatctgcaa gcattatcca cgtgtgggtc
361 ccattctctc gtggtgtctc tgtactacgg ggcaatatt gggcagtacc tttcccagc
30 421 attagcaat tcattgaca aggacatcat tgtggctatg atgtacacgg tggtcacacc
481 catgttg (SEQ ID NO:263).

OR164

35 LOCUS AF179785 475 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU161) gene, partial cds.
ACCESSION AF179785
KEYWORDS .
SOURCE Eulemur rubriventer.
40 ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.
REFERENCE 1 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
45 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 475)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
50 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..475

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/organism="Eulemur rubriventer"
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gene    <1..>475
/ gene="ERU161"
5  CDS    <1..>475
/ gene="ERU161"
/ codon_start=2
/ product="olfactory receptor"
/ translation="VAICKPLHYMNIMSRQLCHLLVAGSWLGGFLHSIIQIFITIQSP
10  FCGPNVIDHYFCDLLPLFKLACTDTFVEGLTVLANSGLIPVCSLFILVSSYIIILVHL
RKHSAEGRHKALSTCASHITVVILFFGPAIFLYMRPSSFTEDKLMGVLYTVITPS" (SEQ ID
NO:264).

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BASE COUNT 92 a 133 c 97 g 153 t

ORIGIN

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15  1 cgtggcaatc tgcaagcctc ttcattacat gaatattatg agtcgtcaac tgtgtcacct
61 tctggtggct gggtcctggc tgggaggcct tcttcactct attattcaga tttttatcac
121 catccaatcg cctttttgtg gtccaacgt gattgaccac tacttctgtg acctcctgcc
181 attattcaag ctgctctgca ccgacacctt ttagaggggg ctgactgtgt tggccaatag
241 tggcttaatt cccgtgtgct cctgtttat cctggtgtcc tctatatca ttattctggt
20  301 gcacttgagg aacattctg cagaggggag gcacaaagcc ctctctacct gtgcctctca
361 catcacgtg gtcattttgt ttttggacc tgccatcttc ctctacatgc gaccttctc
421 taccttcaca gaagacaaac tcatgggtgt gttgtacaca gtcacaccc ccagt (SEQ ID NO:265).

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OR165

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25  LOCUS  AF179786 487 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU162) gene, partial cds.
ACCESSION AF179786
KEYWORDS .
30  SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 487)
35  AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
40  AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
45  source 1..487
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
gene <1..>487
/ gene="ERU162"
50  CDS <1..>487
/ gene="ERU162"
/ codon_start=2
/ product="olfactory receptor"
/ translation="VAISNPPLYVQAMPRKLCICFIICSYTGGFVNAILTSNTFTLD

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FCGDNVIDDFFCDVPPLVKLACDVEGSYQAVLYFLLASNVISPAMLILASYVFHIAAV
 LRVSRSSRGLKAFSTCSSHLISVTLYYGSILYIYSRPSSSYSLERDKMVSTFYTVLFP
 TL" (SEQ ID NO:266).

BASE COUNT 91 a 158 c 98 g 140 t

ORIGIN

1 tgtggccatc tccaaccccc cgctctatgt tcaggccatg ccaaggaaac tgtgcatctg
 61 ttccattatc tgttcataca ctggaggctt tgttaatgca ataataataa ccagcaacac
 121 attcacgttg gatttttgtg gtgacaatgt catcgacgac ttttctgtg atgtcccacc
 181 cctgggtgaag ttggcctgtg atgtggaagg gagctaccag gctgtgctgt acttctctct
 241 ggcctccaac gtcattctcc cggccatgct catcctcgcc tctacgtct tcatcatcgc
 301 agcagctctg aggggtccgct ccagccgggg ccgcctcaag gccttctcca cgtgctctct
 361 ccacctgacg tctgttacct tatactacgg ctccattctc tacatctact ctgcaccaag
 421 ttccagctat tccctcgaga gggacaaaat ggtctctacc tttaacaccg tgctgttccc
 481 cagctc (SEQ ID NO:267).

OR166

LOCUS AF179787 478 bp DNA PRI 31-DEC-2000

DEFINITION Eulemur rubriventer olfactory receptor (ERU163) gene, partial cds.

ACCESSION AF179787

KEYWORDS .

SOURCE Eulemur rubriventer.

ORGANISM Eulemur rubriventer

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.

REFERENCE 1 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 478)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..478

/organism="Eulemur rubriventer"

/db_xref="taxon:34829"

gene <1..>478

/gene="ERU163"

CDS <1..>478

/gene="ERU163"

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/product="olfactory receptor"

/translation="VAVCNPLHYLTVMNRQLCLQLVFACWCGGFIHSVTQVILVIQLP

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RTLRLHQGQSKAFSTCASHLMVSLIFVPCVFIYLRPFCSFSVDKIFSVFYMVITPML" (SEQ ID
 NO:268).

BASE COUNT 85 a 132 c 108 g 153 t

ORIGIN

1 tgttgccgta tgtaaccctt tgcattacct gacggtcacg aaccgccagc tctgccttca
 61 gttgggtttt gcctgctggt gtgggggttt catcactct gtcacacagg ttatactggt
 121 catccagctg cccttctgtg gccccaacaa attggacagt ttctactgtg atgtcccaga

181 ggatcatcaag ctggcctgcc tggacaccta tgggtagaa gtgctgatgg ttaccaacag
 241 tggctcgtcta tctctgtct gctcttgggt ctgatatc tctatgcc ccatcctgac
 301 caccctgaga actgcctcc accagggcca gagcaaggcc tctctacct gtgcctccca
 361 cctaattgtg gtcagcctga tctttgtgcc atgtgtattc atctactga ggcctttctg
 5 421 cagcttctct gtggataaga tattctctgt gttttacatg gtgatcacac ctatgttg (SEQ ID NO:269).

OR167

LOCUS AF179788 487 bp DNA PRI 31-DEC-2000
 10 DEFINITION Eulemur rubriventer olfactory receptor (ERU164) gene, partial cds.
 ACCESSION AF179788
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 15 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 20 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 25 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 30 gene <1..>487
 /gene="ERU164"
 CDS <1..>487
 /gene="ERU164"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYTTIISTRVCILLVCSSWLAGFLIIFPPIILLQLD
 FCASNIIDHFICDSSPILQLSCTNTHFLELMAFCLAVVTLMVTLTLVILSYTNIIRTI
 LRIPSMSQRKKAFSTCSSHIIVVSLSYGSCIFMYIKPSTRERVTLKGVAVVNTSVAP
 40 LL" (SEQ ID NO:270).
 BASE COUNT 116 a 116 c 79 g 176 t
 ORIGIN
 1 tgtggccatc tgcaaacctc ttcattacac aaccatcatt agcaccaggg ttgtatcct
 45 61 tctgtctgt agctcctggc ttgcaggatt ctgcatcgc ttccaccaa taatccttct
 121 tctgcagtg gacttctgtg cctccaatat aattgatcat ttatctgtg attcttctcc
 181 aattctgcag ctttctgta caaacactca ctttctagaa ctcatggcat ttgttttagc
 241 cgtggtgaca ctcattgtca ccttgacct agttattctc tctatacaa atattatcgc
 301 gacaattcta agaattcctt ctatgagtc aaggaaaaaa gccctttcca ctgttctc
 361 ccatataata gttgtttccc tctcttatgg tagttgtatc tcatgtaca taaagccttc
 50 421 tacaagggaa aggggtgact taagcaaagg agtagctgtg gtaatactt cagtggctcc
 481 tcttttg (SEQ ID NO:271).

OR168

LOCUS AF179789 483 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer ERU165 pseudogene, partial sequence.
5 ACCESSION AF179789
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
REFERENCE 1 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 483)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..483
/organism="Eulemur rubriventer"
/db_xref="taxon:34829"
25 gene <1..>483
/gene="ERU165"
/pseudo
BASE COUNT 98 a 144 c 108 g 133 t
ORIGIN
30 1 cgttgccatc tgcaagcccc tccactaccc ccgtgctcat gaggcagcagg gtctgcacac
61 agctcatcct cgctgctgg ctggcagggt tctccttcat cattgtgcct gtcacctga
121 ccagtcagct tccattctgt gacaccacaca tcaaccactt cttctgtgac tatacacctc
181 taatggaggt ggtctgcagt gggccaaagg tgctggagat ggtggatttt accctggcct
241 tgggtggcag gtcagcacc ttgggtgctga tcaccctgtc ctacatccag atcatcagga
35 301 cgattgtcag gatccccctt gtccaggaga ggaaaaaggc ttctccacc tgttcctccc
361 atgtcatcgt ggttaccatg tgctatggaa gctgttttt tatgtatgtc aagccctccc
421 caggcaaagg ggttgatcta aacaaaggag tgtcttaate aatacaatta ttgccccct
481 ctt (SEQ ID NO:272).

OR169

LOCUS AF179790 486 bp DNA PRI 31-DEC-2000
DEFINITION Eulemur rubriventer olfactory receptor (ERU167) gene, partial cds.
45 ACCESSION AF179790
KEYWORDS .
SOURCE Eulemur rubriventer.
ORGANISM Eulemur rubriventer
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Strepsirhini; Lemuridae; Eulemur.
50 REFERENCE 1 (bases 1 to 486)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..486
 /organism="Eulemur rubriventer"
 /db_xref="taxon:34829"
 gene <1..>486
 /gene="ERU167"
 CDS <1..>486
 /gene="ERU167"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLRYTDIMTPRLCGLLVSLSLICSADALLHSLMLLQLS
 FCTDLEISLFFCEVVQVVKLACSDTLVNNLLIYFAACTLGGIPLSGIIFSQTQIATSI
 LKMPSSGRKYKAFSTCGSHLSVVSFLFYGTGLGVYISSAVSDSSRRTAVASVMYTVVTP
 C" (SEQ ID NO:273).

BASE COUNT 83 a 139 c 107 g 157 t
 ORIGIN

1 tgtggccatc tgcaccctc tgagatacac agacatcatg actcctcgtc tgtgtggtct
 61 gctggttca ctttccctgt ccatttgctc cgcggatgcc ctgctccaca gcctcatgct
 121 gctgcagctg tccttctgca cagacctga aatctccctt ttcttctgtg aagtcgttca
 181 ggctgcaag ctgcgtgct ccgataccct cgtaacaac ctctgatct atttgcagc
 241 ttgcaccttg ggtggcattc ctctgtctgg catcattttt tcttacactc aaatagccac
 301 ctccattttg aaaatgccgt catcgggcag aaagtataaa gccttttcca cctgtggggtc
 361 tcacctgtca gttgtttccc tgttctatgg gacagggttg ggggtgtaca tcagttctgc
 421 agtttctgac tcttcaagga ggactgcggt ggcttcagtg atgtacactg tggtcactcc
 481 ctgttg (SEQ ID NO:274).

OR170

LOCUS AF179791 487 bp DNA PRI 31-DEC-2000
 DEFINITION Eulemur rubriventer olfactory receptor (ERU168) gene, partial cds.
 ACCESSION AF179791
 KEYWORDS .
 SOURCE Eulemur rubriventer.
 ORGANISM Eulemur rubriventer
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Strepsirhini; Lemnidae; Eulemur.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Eulemur rubriventer"

/translation="PAICQPLRYRVLNMHRLCVLLVGAAWVLCCLKSVTETVIAMRLP
FCGHHVVSHTCEILAVLKLTCGNTSVSEVFLLVGSILLPVPLAFICLSYLLILATI
LRVPSAAGCRKAFSTCSAHLAVVLLFYSTIIFTYMKPKSKEAHISDEVFTVLYAMVTP
ML" (SEQ ID NO:277).

5 BASE COUNT 79 a 163 c 125 g 119 t
ORIGIN

1 cctgccatct gccagccact caggtaccgc gtgctcatga accaccggct ctgtgtgctg
61 ctgggtggag ctgcctgggt cctctgcctc ctcaagtcgg tgactgagac agtcattgcc
121 atgaggctgc cttctgtgg ccaccacgtg gtcagtcact tcacctgca gatcctggcg
10 181 gtgctgaagc tgacgtgagg taacacatcg gtcagcgagg tcttctgct ggtgggctcc
241 atctgtctgc tgctgtgcc cctggcattc attgctgt cctactgct catcctggcc
301 accatcctga gggtgccctc agctgctggg tgccgcaaag cctctccac ctgtcagca
361 cacctggctg tgggtgtgct ttctacagc accatcatct tcacgtacat gaagcccaag
421 agcaagggaag ccacatctc tgatgaggtc ttacagtcc tctacgccat ggtcacacc
15 481 atgttg (SEQ ID NO:278).

OR172

20 LOCUS AF179793 489 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY173 pseudogene, partial sequence.
ACCESSION AF179793
KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus
25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 489)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

30 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 489)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

40 source 1..489
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>489
/gene="MSY173"
/pseudo

45 BASE COUNT 95 a 120 c 104 g 170 t
ORIGIN

1 cgtggccatc tgtaaccac ttgtgtacac ggtcaccatg tctccccaga tgtgtttgct
61 ccttttgctg ggtgtctatg ggatgggggt tttggggct gtgactcata tgggaacat
121 aacgtttatg tctttttgtg gagacaacct tgtcaatcac tacatgtgtg acctccttc
50 181 tctccttgag ctctcttgca acagcactta cataaattg ctggtgggtt ttattattgt
241 gaccaatggc attgggggtc caattgtcac catttttate tcttatgggt ttattcttc
301 cagcattctc cacattagct ccacagaggg cagggtctaa gccttcagta cctgcagttc
361 cacataattg tggatatgct gttctttggg tcagggtgct tcatgtacct cacaccacct
421 tctagtctac ccttggaacca ggggaacgtg tctccattt ttatactgc tgtaatgccc

481 atgtagatt (SEQ ID NO:279).

OR173

5 LOCUS AF179794 481 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY174) gene, partial cds.
ACCESSION AF179794
KEYWORDS .
SOURCE Barbary ape.
10 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.
REFERENCE 1 (bases 1 to 481)
15 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 481)
20 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
25 source 1..481
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>481
/gene="MSY174"
30 CDS <1..>481
/gene="MSY174"
/codon_start=2
/product="olfactory receptor"
/translation="VAICKPLHYATIMSQPMCGFLMGVAGILGFVHGGIQTFLIAHLP
35 FCGPNVIDHFMCDLVPLLELACTDTHTLGPLIAANSGLCFLIFSMLVASYVILCSL
RTHISEGRHKVLSSCTSHIFVVILFFVPCSYLYLRPLTSFFPTDKAVTVFCTLFTPML" (SEQ ID
NO:280).
BASE COUNT 92 a 126 c 97 g 166 t
ORIGIN
40 1 tgtggccatc tgtaagccct tgcactatgc aaccatcatg agtcaaccta tgttgaggatt
61 cctgatgggg gtggctggga ttctgggatt tgtgcatgga gggatccaga cttgttcat
121 agcccactta ccattctgtg gccctaatgt catcgaccac ttatgtgtg atttagtacc
181 tcttctagag ctggcctgca cagacactca caccttgggg cctctgatag ctgccaacag
241 tggatcattg tgtttctca tttttccat gctggttgct tcctatgtca tcactctgtg
45 301 ctcctaagg actcatatct ctgaaggcgg tcacaaagt ctgtctagtt gtacctctca
361 tatcttgtt gtcatttat tctttgtccc ttgttcatac ctgtatctaa gacctctaac
421 ctccttctc cccactgaca aagctgtgac tgtgtttgc accctattha cacctatgtt
481 g (SEQ ID NO:281).

50 OR174

LOCUS AF179795 402 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus MSY175 pseudogene, partial sequence.
ACCESSION AF179795

KEYWORDS .

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 402)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 402)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..402

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>402

/gene="MSY175"

/pseudo

BASE COUNT 89 a 105 c 77 g 131 t

ORIGIN

1 tgtggccatc tgaagcccc tgcattacac caccatcatg agcagcaaaa tctgcatgca
61 gcttgtgctt ggggtgtggc ttgctggtt ctcgtcacct ttccaccact cctcttaggc
121 ctaaattctg actctgtgc ctgctccaa cgtcattaat cattctact gtgacactac
181 tccactctg cagatttct gcactgacac acagctcctg gacaggatgg gattcatttc
241 agcattggtg acactcttag tcacattggt aatggtgatg gtatcatgat atccctttct
301 tatggcagtt gcatcttcat gtatgttaag ccacggtca aacaaaagat atattttca
361 aagggaattt tgggtgctca caccctgtgc gttccacttt tg (SEQ ID NO:282).

OR175

LOCUS AF179796 487 bp DNA PRI 31-DEC-2000

DEFINITION *Macaca sylvanus* olfactory receptor (MSY176) gene, partial cds.

ACCESSION AF179796

KEYWORDS .

SOURCE Barbary ape.

ORGANISM *Macaca sylvanus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 source 1..487
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 5 gene <1..>487
 /gene="MSY176"
 CDS <1..>487
 /gene="MSY176"
 /codon_start=2
 10 /product="olfactory receptor"
 /translation="VAICNPLLYALVVSPKVCRLLVSLTYLQSLITALTVSSCVFSVS
 YCSSNIINHFYCDDVPLLALSCSDTYIPETAVFIFSGTNLFFSMTVVLLISYFNIVITI
 LRISSEGRQKAFSTCASHMIAVVVFYGTLLFMYLQPRSNHSLDSDKMASVFYTLIIP
 ML" (SEQ ID NO:283).

15 BASE COUNT 104 a 123 c 87 g 173 t
 ORIGIN

1 cgtgctatt tgcaaccctc tgctctacgc attagtgggtg tctccaaagg tatgtcgtct
 61 gctggtgtcc ctcacatacc ttcagagtct tatcacagcc cttactgtct ctctctgtgt
 121 gttctctgtg tcactactgtt ctccaacat catcaacat tttactgtg acgatgtccc
 20 181 ttgctagca ttgtcgtgtt ctgataccta cattccagaa acagcagtgt ttatcttttc
 241 agggaccaat ttgttttct ccatgaccgt tgttctgata tctacttca acattgttat
 301 taccatttg aggatacgtt cctcagaagg acgacaaaaa gccttttcca cgtgtgcttc
 361 tcacatgata gctgtggttg tgtctatgg gactctcctt tcatgtatt tgcaaccaag
 421 gagtaatcac tcattagata ctgacaaaat ggcctcggtc ttctacacc tgatcatacc
 25 481 tatgttg (SEQ ID NO:284).

OR176

LOCUS AF179797 487 bp DNA PRI 31-DEC-2000
 30 DEFINITION Macaca sylvanus olfactory receptor (MSY177) gene, partial cds.
 ACCESSION AF179797
 KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

35 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
 Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

40 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

45 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Macaca sylvanus"
 /db_xref="taxon:9546"
 gene <1..>487
 /gene="MSY177"
 CDS <1..>487

BASE COUNT 83 a 144 c 105 g 155 t

ORIGIN

1 tgtggccatc tgcttcccc tgcaactac cgccatcatg agcccatgc tctgtctgc
61 cctgggtggc ctgtctctgg tactgaccac ctccatgcc atgttacaca ctttactcat
121 ggccagggtg tgtttttg cagacaatgt gatccccac ttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactca agttaatgaa ttggcgatat ttatcacggg
241 agggctgatt ctgtcatcc ctttctact catcctggg tctatgcac ggattgtctc
301 ctccatctc aagggtccct cgtctaaggg tatctgcaag gccttctcta ctgtgtgctc
361 ccacctctct gtgtgtgtcac tgtctatgg gaccgtatt ggtctctact tctgccatc
421 agctaatagt tctactctaa aggagactgt catggctatg atgtacactg tggtagcccc
481 catgctg (SEQ ID NO:288).

OR178

15 LOCUS AF179799 484 bp DNA PRI 31-DEC-2000
DEFINITION Macaca sylvanus olfactory receptor (MSY179) gene, partial cds.
ACCESSION AF179799
KEYWORDS .

SOURCE Barbary ape.
20 ORGANISM Macaca sylvanus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 484)
25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)
30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
35 source 1..484
/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene <1..>484
/gene="MSY179"
40 CDS <1..>484
/gene="MSY179"
/codon_start=2
/product="olfactory receptor"
/translation="CAICCPHYTTAMSPKLCILLSLCWVLSVLYGLIHTFLMTTVT
45 FCGSRKIHIFCEMYVLLRLACSDTQINHTVLIATGCFIFLIPFGFMIISYVLIVRAI
LRIPSVSKKYKAFSTCASHLGVVSLFYGTLCMVYLKPLHTYSVKDSVATVMYAVVTPM
M" (SEQ ID NO:289).

BASE COUNT 102 a 139 c 93 g 150 t

ORIGIN

50 1 atgtgccatc tgctgcccc tccactacac cacagccatg agccctaagc tctgtatctt
61 actctcttcc ttgtgtggg tcttatctgt gctctatggc ctcatacaca ccttctcat
121 gaccacgggtg accttctgtg ggtcacgaaa aatccactac atcttctgtg agatgtatgt
181 attgctgagg ctggcatgtt ccgacactca gattaatcac acagtgtctga ttgccacagg
241 ctgctttatc ttctctatc cctttggatt catgatcatt tctatgtgt tgattgtcag

301 agccatcctc agaataccct cagtctctaa gaaatacaaa gccttctcca ctgtgcctc
 361 ccatttgggt gtagtctccc tctctatgg gacactttgt atggataacc tgaagccct
 421 ccatactac tcttgaagg actcagtagc cacagtgatg tatgcggtgg tgacacccat
 481 gatg (SEQ ID NO:290).

OR179

LOCUS AF179800 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus MSY180 pseudogene, partial sequence.

ACCESSION AF179800

KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>487

/gene="MSY180"

/pseudo

BASE COUNT 92 a 143 c 100 g 152 t

ORIGIN

1 tgctgccata tgccaccctc tccattacac tgccatcatg aggggaagagc tctgtgtctt
 61 cttagtggct gtagtctgaa ttctgtcttg tgccagctcc ctctctcaca ccttctcct
 121 gaccagctg tctttctgtg ctggaacac catccccac atcttctgtg acctgctgc
 181 cctgtcaag ctgtcttggt cagatatctt cctcaatgag ctggtcatgt tcacagtagg
 241 ggtggtggc attacctgc cattcatgtg tctcctggta tcatatggct aactggggc
 301 caccatctg agggtcctt caaccaaagg gatccacaaa gcattgtcca catgtgcctc
 361 ccattctctc gtggtttctc tctattatgg gtcaatattt ggccagtaac atttccaac
 421 tgtaagcagt tctattgaca aggatgttac tgtggctctc atgtacatcg tggtcacacc
 481 cgtgttg (SEQ ID NO:291).

OR180

LOCUS AF179801 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus MSY181 pseudogene, partial sequence.

ACCESSION AF179801

KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;
Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Macaca sylvanus"

/db_xref="taxon:9546"

gene <1..>487

/gene="MSY181"

/pseudo

BASE COUNT 92 a 144 c 100 g 151 t

ORIGIN

1 tctgcccata tgcaccctc tccattacac tgccatcatg aggggaagagc tctgtgtctt
61 cttagtggct gtatcttgaa ttctgtcttg tgccagctcc ctctctcaca ccttctcct
121 gaccagctg tctttctgtg ctgcgaacac catccccac atcttctgtg acctgtctgc
181 cctgctcaag ctgtcctggt cagatatctc cctcaatgag ctggatcatgt tcacagtagg
241 ggtggtggtc attacctgct cattcatgtg tatctggtga tcatatggct acactggggc
301 caccatctctg agggctccct caaccaaagg gatccacaaa gcattgtcca catgtgcctc
361 ccattctctct gtggtttctc tctattatgg gtcaatatt ggccagtaac atttcccaac
421 tgtaagcagt tctattgaca aggatgttac tgtggctctc atgtacatcg tggtcacacc
481 cgtgttg (SEQ ID NO:292).

OR181

LOCUS AF179802 487 bp DNA PRI 31-DEC-2000

DEFINITION Macaca sylvanus olfactory receptor (MSY182) gene, partial cds.

ACCESSION AF179802

KEYWORDS .

SOURCE Barbary ape.

ORGANISM Macaca sylvanus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Cercopithecidae; Cercopithecinae;

Macaca.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

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/organism="Macaca sylvanus"
/db_xref="taxon:9546"
gene      <1..>487
/feature   /gene="MSY182"
5         CDS      <1..>487
/feature   /gene="MSY182"
/feature   /codon_start=2
/feature   /product="olfactory receptor"
/feature   /translation="VAICKPLHYMVIMNNRVCTLLVLCSWVAGLMIIVPPLSLGLQLE
10         FCGSNAIDHFSCDAGPLLKISCSDTWVIEQIVILMAVFALIITLVCVILSYLYIVRTI
LRFPSVQQRKKAFTSCSSHMIVVSIAYGSCIFVYIKPSAKDEVAINKGVSVLTTSVAP
LL" (SEQ ID NO:293).

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BASE COUNT 115 a 113 c 98 g 161 t

ORIGIN

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15         1 tgtggccatc tgtaacccc ttcattatat ggatcatcatg aacaacaggg tgtgtacctt
61 attagtcctc tgcagttggg tggctggctt gatgatcatt gttccaccac tgagcttagg
121 cctccagctc gaattctgtg gctccaatgc cattgatcat ttagctgtg atgcaggtcc
181 tctcctaaag atctcatgct cagacacatg ggtaatagaa cagatagta tacttatggc
241 tgtatttgca ctattatca ccctagtttg tgtgattctg tctacttgt acatagtcag
20        301 aacaattctg aggttccctt ctgttcagca aaggaaaaag gccttttcta cctgttcac
361 ccacatgatt gtggtttcca ttgcctatgg aagctgcac ttcgtctata tcaagccctc
421 tgcaaagat gaagtggcca taaataaagg agtttcagtt ctactactt ctgttcacc
481 ctgttg (SEQ ID NO:294).

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OR182

LOCUS AF179803 487 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA169) gene, partial cds.

ACCESSION AF179803

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA169"

CDS <1..>487

/gene="CJA169"

/codon_start=2

/product="olfactory receptor"

/translation="VAICRPLYYSTVMSPQVCALILALCWVLTNVVALTHTLLMARLS
FCVTGEIAHFFCDITPVLKLSGSDTHINEMMVFLGGTVLIVPFICIVTSYIHIVPAI
LRVRTCGGAGKAFSTCSSHLCIVCIFYGTLSAYLCPPSIASEEKDIAAAALYTIVTP
ML" (SEQ ID NO:295).

5 BASE COUNT 89 a 147 c 103 g 148 t
ORIGIN

1 tgtggccatt tgcggcccc tgtactactc cacagtcacg agccccaag tctgtgccct
61 aatccttgca ttgtctggg tctcaccac ttgtgtgcc ctgactcaca cactcctcat
121 ggctcgactg tcttctgtg tgactggga aatagctcac ttttctgtg acatcactcc
10 181 tgcctgaag ctatcatgtt ctgacacca catcaacgag atgatggtt ttgtctggg
241 aggcacagta ctcattgtcc cttttatag cattgtcacc tctacatcc acattgtgcc
301 tgcctcctg aggggtcga cctgtgtgg ggccgggcaag gcctttcca cctgcagttc
361 ccacctgc attgtttga tattctatgg gacctcttc agtgcctacc tgtgtcctcc
421 ctctattgcc tctgaagaga aggacattgc agcagctgca ctgtatacca tagtgactcc
15 481 catgttg (SEQ ID NO:296).

OR183

LOCUS AF179804 486 bp DNA PRI 31-DEC-2000

20 DEFINITION Callithrix jacchus olfactory receptor (CJA170) gene, partial cds.

ACCESSION AF179804

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

25 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

30 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

35 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Callithrix jacchus"

40 /db_xref="taxon:9483"

gene <1..>486

/gene="CJA170"

CDS <1..>486

/gene="CJA170"

45 /codon_start=1

/product="olfactory receptor"

/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRSL

FCTDLEIPRFFCELNQVIHLACSDTFLNDVVMYLA AVLGGGPLAGILYSYSKIVSSI

RAISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP

50 ML" (SEQ ID NO:297).

BASE COUNT 96 a 135 c 102 g 153 t

ORIGIN

1 gtggccatct gtcaccact gcactacaca gtcaccatta accccagact gtgtggactg
61 ctggttctgg catcctggat cctgagtgcc ctgaattcct cattacaaac cttaatatg

121 ctgcggcttt ccttctgcac agacttgga atcccccgct tttctgcga acttaatcag
 181 gtcatccacc ttgcctgttc tgacactttt cttaatgatg tggatgatga ttggccgct
 241 gtgctgctgg ggggtggtcc ccttcagggg attctttact ctactctaa gatagtttc
 301 tccatcgtg caatctcgc agctcagggg aagtacaagg catttccac ctgtgtatct
 361 cacatctaa ttgtctcctt atttatggt acactcctag gtgtgtacct tagttctgct
 421 gcaactggca actcacattc aagagctgca gcctcgggtga tgtacctgt ggtcaccccc
 481 atgctg (SEQ ID NO:298).

OR184

LOCUS AF179805 487 bp DNA PRI 31-DEC-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA171) gene, partial cds.
 ACCESSION AF179805
 KEYWORDS .

SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA171"

CDS <1..>487

/gene="CJA171"

/codon_start=2

/product="olfactory receptor"

/translation="VAICNPLLYMVTMSPQVCLLLLGVYGMGALGAVAHMGNIMFMT

FCAETLVNHYMCDILPLELSCNSSYINLLVFIIVTIGIGVPIVTIFISYGFILSSI

LHISAEGRSKAFSTCSSHIVVLLFFGSGAFMYLKPPSILPLDQKVVSSIFYTAVVP

MF" (SEQ ID NO:299).

BASE COUNT 88 a 118 c 107 g 174 t

ORIGIN

1 cgtggccatc tgtaaccac tgtgtacat ggtcaccatg tctcccagg tgtgcttgc
 61 ccttttggg ggtgtctatg ggtgggggc ttgggggct gtggctcata tgggaaacat
 121 aatgtttatg acctttgtg cagaaacct tgtaacacac tacatgtgtg acatccttc
 181 cctccttgag ctctcctgca acagctctta cataaatttg ctgttggttt ttattattgt
 241 gaccattggc attgggggtgc ccattgtcac cattttatc tcttatggtt ttattctttc
 301 cagcattctc cacattagtt ctgctgaggg cagggtctaa gccttcagta cctgcagtc
 361 ccacatagtt gtggfattgc tttctttgg gtcaggagct ttatgtacc tcaaaccacc
 421 ttctattcta cccctggacc aggggaaagt gtctccatt ttatatactg cggtgtgtgc
 481 catgttt (SEQ ID NO:300).

OR185

LOCUS AF179806 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA196) gene, partial cds.

ACCESSION AF179806

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>487

/gene="CJA196"

CDS <1..>487

/gene="CJA196"

/codon_start=2

/product="olfactory receptor"

/translation="LAICHPLHYSSKMSLCSTLMLGCLWTTASLHALLHTLLARLD

FCASNVIPYFFCDLVPLLQLSCSDTRLNQLMIVLVGGLIILLPFLGILGSYTCIAAAV

LRVPSARGTWKAFSTCGSHLTMVILFYGTISGVYLRPSSSHSTDKDSLASVMYMMVVT

ML" (SEQ ID NO:301).

BASE COUNT 78 a 176 c 105 g 128 t

ORIGIN

1 ctggccatc tggcaccgc tgcactactc ctccaagatg agcctgtgca gctgcaccct

61 aatgttgggc tgcttatgga ccaactgccag ctccatgcc cttctgcaca ccctctctt

121 ggcccggctg gactctgtg ccagcaatgt tatccctac ttctctgtg acctgttcc

181 cctgtccag ctctctgtt ctgacaccg actcaaccag ctcatgattg tgctgtggg

241 ggccctgac atcctctgc cttccttg cattctcgt tctacacat gcattgcagc

301 tgcaagtctc agagtccct ctgccagggg tacgtggaag gcctttcca cctgtggctc

361 ccacctgacc atgtcatcc tctctatgg caccatctca ggggtctacc tgaggccctc

421 atcctccac tccacagaca aggactcact agcctcagtg atgtacatgg tagtgacccc

481 catgctg (SEQ ID NO:302).

OR186

LOCUS AF179807 487 bp DNA PRI 31-DEC-2000

DEFINITION Callithrix jacchus olfactory receptor (CJA197) gene, partial cds.

ACCESSION AF179807

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
15 source 1..487
/organism="Callithrix jacchus"
/db_xref="taxon:9483"
gene <1..>487
/gene="CJA197"
20 CDS <1..>487
/gene="CJA197"
/codon_start=2
/product="olfactory receptor"
/translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
25 FCTDLEIPHFFCELNQVIHLACSDTFLNDVVMYLA AVLLGGGPLAGILYSYSKIVSSI
RAISSAQGKYKAFSTCVSHILIVSLFYGTLLGVYLSSAATGNSHSRAAASVMYTVVTP
ML" (SEQ ID NO:303).

BASE COUNT 98 a 134 c 100 g 155 t

ORIGIN
1 tgttgccata tgcacccac tgcactacac agtcaccatt aacccagac tgtgtggact
30 61 gctggttctg gcatcctgga tctgagtg cctgaattcc tcattacaaa ccttaatagt
121 gctgcggctt tcttctgca cagacttga aatccccac ttttctgcg aacttaatca
181 ggatcatccac ctggcctgtt ctgacacttt tcttaatgat gtggtgatgt atttgccgc
241 tgtgctgctg ggggggtggtc cccttcagg gattctttac tcttactcta agatagtctc
301 ctccatacgt gcaatctcat cagctcagg gaagtacaag gcattttcca cctgtgtatc
35 361 tcacatctta attgtctct tatttatgg tacactcta ggtgtgtacc ttagttctgc
421 tgcaactggc aactcacatt caagagctgc agcctcgggtg atgtacactg tggtcacccc
481 catgctg (SEQ ID NO:304).

OR187

40 LOCUS AF179808 487 bp DNA PRI 31-DEC-2000
DEFINITION Callithrix jacchus olfactory receptor (CJA198) gene, partial cds.
ACCESSION AF179808
KEYWORDS .
45 SOURCE Callithrix jacchus.
ORGANISM Callithrix jacchus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
 source 1..487
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>487
 /gene="CJA198"
 CDS <1..>487
 /gene="CJA198"
 /codon_start=2
 /product="olfactory receptor"
 /translation="IAICSPLLYNVIMSYHFCFRLTVGVYILGILGSTIHTSSMLRLF
 LCKTNVINHYFCDLFPILLESCSSTYINELLVLVLSALNILTPALTILASYIFTIASI
 LHIRSTEGRSKAFSTCSSHISAVAVFFGSAAFMYLQPSSVSSMDQGVSSVFYTTVPV
 ML" (SEQ ID NO:305).

BASE COUNT 101 a 138 c 87 g 161 t

ORIGIN

1 cattgccatc tgtagccct tctgtacaa tgtcatcatg tcctatcact tctgcttccg
 61 gctcacagtg ggagtttaca ttttaggcat ccttgatct acaattcaca ccagctctat
 121 gttgagactc ttctgtgca aaactaatgt gattaacctat tattttgtg atctcttccc
 181 tctcttgga ctcctctgct ccagtaccta catcaatgaa ttactagttc tggcttgag
 241 tgcattgaat atctcgacgc ctgccttaac tatcctggcc tcttatatct tcaccattgc
 301 cagtatctc cacattcgct ccactgaggg cagggtccaaa gccttcagca ctgcagctc
 361 ccacatctca gctgttgctg tcttcttgg atctgcagca ttcattgacc tgcagccatc
 421 atctgtcagt tccatggacc aggggaaagt gtcattctgtg ttttacacaa ctgttggtgcc
 481 catgctg (SEQ ID NO:306).

OR188

LOCUS AF179809 469 bp DNA PRI 31-DEC-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA199) gene, partial cds.
 35 ACCESSION AF179809
 KEYWORDS .
 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 40 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 469)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 45 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 469)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..469
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"

gene <1..>469
 /gene="CJA199"
 CDS <1..>469
 /gene="CJA199"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYTTVMSRGLCCVLVAASWMGGFVHSTVQTILTIRLP
 FCGPNQVDNFFCDVPPVIKLACADTFVIELLMVSNGLISTSSFVVLISYTTILVKI
 HSKEGRRKALSTCASHLMVVTLFGPCSFYHPFSTFSVDKMSVLYKVITPML" (SEQ ID

NO:307).

BASE COUNT 91 a 126 c 97 g 155 t

ORIGIN

1 tgttgctatc tgcaccccc tgcactacac cactgtcatg agtcggggat tatgctgtgt
 61 gttgggtgct gcctcctgga tgggaggatt tgtgcactcc accgtccaga ccattctcac
 121 tatccgtctg ccttttgtg ggccaaatca ggtggacaac tttttgtg atgtccccc
 181 tgcatcaaa cttgcctgtg ctgacacttt tgcattgaa ttgctcatgg tatctaacag
 241 tgggtgatc tccaccagct cctttgtgtg gctgatttcc tctacacca ctatctagt
 301 caagattcac tccaaggagg gaaggcgaaa ggcacttccc acatgtgect ctacattat
 361 ggtgtaaca cttttggac cctgtagttt catctatct catccttct ctacatttc
 421 tgtggacaag atggtgtctg tactctacaa ggttattact ccaatgcta (SEQ ID NO:308).

OR189

LOCUS AF179810 488 bp DNA PRI 31-DEC-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA201) gene, partial cds.

ACCESSION AF179810

KEYWORDS .

SOURCE Callithrix jacchus.

ORGANISM Callithrix jacchus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.

REFERENCE 1 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..488

/organism="Callithrix jacchus"

/db_xref="taxon:9483"

gene <1..>488

/gene="CJA201"

CDS <1..>488

/gene="CJA201"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLRYMLLSMSHICVTMIIVCWSISIAGALILTVFTMHLP

YCGPYKINHFFCEVPAVLKLACADTSFNDRDLFILGFILLVPLSLILASYVFIFASI

FRIRSAQGRLKSFSTCASHVTVVTMFYGPAILMYMRPGSWYDPERDKKLALFYNVVSG

FL" (SEQ ID NO:309).
 BASE COUNT 84 a 145 c 105 g 154 t
 ORIGIN

1 cgttgccatt tgcttcccc ttcgctatat gctactcatg agccattcca ttgtgtcac
 5 61 gatgattata gttgttggc ccattagcat agctggggcc ctgatcctca ctgtcttcac
 121 catgcatctg ccttattgtg gccctacaa gataaaccac ttctctgtg aggtccctgc
 181 tgtcctgaag ttggcctgtg cagacacatc tttaatgac aggctggact tcatttggg
 241 ttcatcctg ctttgggtcc cactctccct catcctggcc tcttacgtct tcattttgc
 301 ctctatcttc agaatccgct cagcgcaggg gaggtcaag tcttctcca cgtgtgcttc
 10 361 ccacgtcact gtgtgcacca tgttctatgg gccggccatc atcatgtaca tgaggcccgg
 421 ttcttggtat gaccagagc gggacaagaa gctagcgtg ttctacaatg tggctctggt
 481 cttctca (SEQ ID NO:310).

OR190

15 LOCUS AF179811 487 bp DNA PRI 31-DEC-2000
 DEFINITION Callithrix jacchus olfactory receptor (CJA202) gene, partial cds.
 ACCESSION AF179811
 KEYWORDS .
 20 SOURCE Callithrix jacchus.
 ORGANISM Callithrix jacchus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Callitrichidae; Callithrix.
 REFERENCE 1 (bases 1 to 487)
 25 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 30 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
 35 source 1..487
 /organism="Callithrix jacchus"
 /db_xref="taxon:9483"
 gene <1..>487
 /gene="CJA202"
 40 CDS <1..>487
 /gene="CJA202"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLRYTATMNLRLCVQLVAGLWLVTYLHALLHTSLIAHLS
 45 FCAFNIHHFFCDLNPLRLSCSAVSFNVMIIFAVGGLLALTPLVCILVFYGLIFSTV
 LKITSTQGKQRAASTCGCHLSVVVLFYGTIAIVYFSPSSHTPESDTLSTVMYSVVP
 ML" (SEQ ID NO:311).

BASE COUNT 86 a 152 c 94 g 155 t
 ORIGIN

50 1 tgtggcaatt tgccaccctc tacgttacac tgccacaatg aacctgcgcc ttgtgtcca
 61 gctagtggct ggactgtggc ttgtactta cctccatgcc ctctgcata ctcccta
 121 agcacatctg tcttctgtg ccttcaatat catccatcat ttctctgtg atctcaaccc
 181 tctactacgg ctctctgtc ctgccgtctc ctcaacgta atgatcatt ttgcagtagg
 241 aggtctattg gctctcagc ccttgtctg tatectcgta tttatggac ttatctctc

301 cactgttctg aagatcacct ctactcaggg gaaacagaga gctgctcca cctgcggctg
 361 ccacctgtca gtagtggtgc tgtttatgg cacagccatt gccgtctact ttagccctc
 421 atctcccat acgctgaga gtgacctct ctgaccgtc atgtattcag tggtgccccc
 481 gatgctg (SEQ ID NO:312).

OR191

LOCUS AF179812 491 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus PPY110 pseudogene, partial sequence.
 10 ACCESSION AF179812
 KEYWORDS .
 SOURCE orangutan.
 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 15 Eutheria; Primates; Catarrhini; Hominidae; Pongo.
 REFERENCE 1 (bases 1 to 491)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 20 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 491)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 25 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..491
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 30 gene <1..>491
 /gene="PPY110"
 /pseudo
 BASE COUNT 92 a 118 c 105 g 176 t
 ORIGIN

35 1 cgtggccatc tgtaaccac tgttgtaaac ggtcaccatg tctcccaga tgtgtttgct
 61 cctttcactg ggtgtctatg ggtatgggggt tttggggct gtggttcata tgggaaacat
 121 aatgtttatg tctttttg gagacaacct tgtcaatcac tatctgtgtg acatccttc
 181 tctcctgag ctctcctgca acagctctta cataaattg ctggtgggtt ttattattgt
 241 gaccattggc attgggggtc caattgtcac catitttata tcttatggtt ttattcttc
 40 301 cagcattctc cacattagct cacagagggc aggtcaggtc taaagccttc agtacctgca
 361 gtcccatcat aattgtgga tcgctttct ttgggtcagg tgctttcatg tacctcaaac
 421 cacttctct tctaccctg gaccagggga aagtgcctc catttttat actgctgtgg
 481 tgcccatgtt t (SEQ ID NO:313).

OR192

LOCUS AF179813 480 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus PPY111 pseudogene, partial sequence.
 50 ACCESSION AF179813
 KEYWORDS .
 SOURCE orangutan.
 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
5 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 480)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
10 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..480
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
15 gene <1..>480
/gene="PPY111"
/pseudo
BASE COUNT 81 a 141 c 100 g 158 t
ORIGIN
20 1 tgtggccatc tgcttcccc tgcactacac catccatcat gagcccatg ctctgtctct
61 cccctttggc gctgtctcgg gtgctgacca cttccatgc catgttacac actttactca
121 tggccaggtt gtgttttgt gcagacaatg tgatcccca cttttctgt gatatgtctg
181 ctctgtgaa gctgtcctgc tctgacactc gagtaatga attggtgata ttatcatgg
241 gagggctcat tctgtcatc ccattcctac tcaccttgg gtcctatgca cgaattgtct
25 301 cctccatcct caaggtccct tctaagggtg tctgaaggc cttctctact tgtggctccc
361 acctctctgt ggtgtccctg ttcatggga ccgtagtggt tctctactta tgcccatcgg
421 ctaatagtc tactctgaag gagactgtca tggctgtaat gtacactgtg gtgaccccca (SEQ ID NO:314).

OR193

30 LOCUS AF179814 486 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus olfactory receptor (PPY112) gene, partial cds.
ACCESSION AF179814
KEYWORDS .
35 SOURCE orangutan.
ORGANISM Pongo pygmaeus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.
REFERENCE 1 (bases 1 to 486)
40 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)
45 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
50 source 1..486
/organism="Pongo pygmaeus"
/db_xref="taxon:9600"
gene <1..>486
/gene="PPY112"

CDS <1..>486
 /gene="PPY112"
 /codon_start=1
 /product="olfactory receptor"
 /translation="CAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLARLS
 FCADHIISHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
 LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
 ML" (SEQ ID NO:315).

BASE COUNT 96 a 147 c 93 g 150 t

ORIGIN

1 tgtgccaatc gtcacctct acattatgcc accatcatga gtcagagcca gtgtgtcatg
 61 ctggtggctg ggtcctgggt catcgcttgt gcgtgtgctc ttgtcatatc cctcctctg
 121 gcccggttt ccttctgtgc tgaccacatc atctctact tcttctgtga ccttggtgcc
 181 ctgctcaagc tgtctgtgc agacacctcc ctcaatcagt tagcaatctt tacagcagga
 241 ttgacagcca tatgcttc attcctgtgc atcctggttt cttatggta cattggggtc
 301 accatctcc agattccctc caccaagggc atatgcaaag ccttggtccac ttgtggatcc
 361 cactctcag tgggtactat ctattatggg acaattattg gtctctattt tctaccccca
 421 tccagcaaca ccaatgacaa gaacataatt gcttcagtga tatacacagt agtcactccc
 481 atgttg (SEQ ID NO:316).

OR194

LOCUS AF179815 487 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus PPY113 pseudogene, partial sequence.

ACCESSION AF179815

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>487

/gene="PPY113"

/pseudo

BASE COUNT 107 a 130 c 95 g 155 t

ORIGIN

1 cactgccatt tgccaccctc taagataaac caatctcatg agacccaaaa ttgtggact
 61 tatgactgcc ttctcctgga tctcgggctc tacggatgga atcattgatg ctgcagcgac
 121 atttctctc tctactgtg ggtctcggga aatagccac ttctctgtg agttccctc
 181 catactaate ctctcatgca atgacacatc aatattgaa aaggttctt tcatctgctg
 241 tatagtaatg attgttttc ctgttgcaat catcatcget tctatgctc aagtattct

301 ggctgtcatt cacatgggat ctggagaggg tcgtcggata gctttcacga cctgttctc
 361 tcacctcatg gtggtgggaa tgtactatgg agcagctttg ttcattgaca tacggcccac
 421 atctgatcgc tccctacac aggacaagat ggtgtctgta ttctacacca tctcactcc
 481 catgctg (SEQ ID NO:317).

OR195

LOCUS AF179816 484 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus olfactory receptor (PPY114) gene, partial cds.

ACCESSION AF179816

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>484

/gene="PPY114"

CDS <1..>484

/gene="PPY114"

/codon_start=2

/product="olfactory receptor"

/translation="VAICFPLHYTAIMSPMLCLSLVALSWVLTTFHAMLHTLLMARLC

FCADNVIPHFFCDMSALLKLSCSDTRVNELVIFIMGGLILVIPFLLILGSYARIVSSI

LKVPSKGICKAFSTCGSHLSVVSIFYGTVSGLYLCPANSSTLKETVMAVMYTVVTPM

L" (SEQ ID NO:318).

BASE COUNT 80 a 142 c 105 g 157 t

ORIGIN

1 tgtggccatc tgcctcccc tgcactacac cgccatcatg agcccatgc tctgtctctc

61 cctggtggcg ctgtcctggg tgcagaccac ctccatgcc atgttacaca ctttactcat

121 ggccaggttg tgttttctg cagacaatgt gatccccac ttttctgtg atatgtctgc

181 tctgctgaag ctgtcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatggg

241 agggctcatt ctgtcatcc cattctact catccttggg tctatgcac gaattgtctc

301 ctccatctc aaggtccctt ctaagggtat ctgcaaggcc ttctctactt gtggtctcca

361 cctctctgtg gtgtccctgt tctatgggac cgtagtggt ctctactt gcccacggc

421 taatagtct actctgaagg agactgtcat ggctgtaatg tacactgtgg tgacccccat

481 gctg (SEQ ID NO:319).

OR196

LOCUS AF179817 483 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY115) gene, partial cds.

ACCESSION AF179817

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 483)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 483)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..483

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>483

/gene="PPY115"

CDS <1..>483

/gene="PPY115"

/codon_start=1

/product="olfactory receptor"

/translation="VAVCHPLHYTLIMHGGLCLGLVAGCLVAGFMNSLMETIITFQLL

LCHNVINHFACE TLAVRLACVDVSFNKAMVAISGFLVILLPCSLILFSYAHIVAAIL

HIPSAQGRRKAFGTCTSHLTVVCMCFGATMFTYMRPAGGSSLEKKNMVALFYAIVIPM

L" (SEQ ID NO:320).

BASE COUNT 86 a 136 c 115 g 146 t

ORIGIN

1 gtggccgtct gccaccact gcattacacg ctcacatgc atggagggtc gtgcctgggg

61 ctggtggccg gctgcctggt ggctggttgc atgaattccc tgaaggaaac aattatcacc

121 ttccagcttc tctgtgtca caatgttatt aatcactttg cctgtgagac ctagcagtg

181 ctacgactag cctgtgtgga cgtctcctc aacaaggcca tggaggccat ctcagggtt

241 ctggtgatcc tgcttccctg ttcactgatc ctattctcct atgctcacat agttgctgcc

301 attctcata ttcttctgc ccagggacgc cgcaaagcct ttgggacttg cacgtctcac

361 ctactgtgg ttgcatgtg ctttggggct acaatgttca cctacatgag acctgcgggc

421 ggctcctccc tggaaaagaa gaatatggt gccctcttt atgccattgt gattccaatg

481 ctt (SEQ ID NO:321).

OR197

LOCUS AF179818 484 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY116) gene, partial cds.

ACCESSION AF179818

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 484)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..484

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>484

/gene="PPY116"

CDS <1..>484

/gene="PPY116"

/codon_start=2

/product="olfactory receptor"

/translation="VAVCHPLHYTLIMHGGLCLGLVAGCLVAGFMNSLMETIITFQLP

LCHNVINHAFACETLAVLRLACVDVSNKATVAISGFLVILLPCSLILFSYAHIVAAIL

RIPSAQGHRKAFGTCTSHLTVVCMCFGATMFTYMRPAGGSLEKENMVALFYAIVIPM

L" (SEQ ID NO:322).

BASE COUNT 85 a 138 c 116 g 145 t

ORIGIN

1 tgtggccgctc tgccaccac tgcattacac gtcacatcg catggagggc tgtgcctggg

61 gctgtggccc ggctgcctgg tggctggtt catgaattcc ctgatggaaa caattacac

121 ctccagctt cccctgtgtc acaatgttat taatcacttt gcctgtgaga ccttagcagt

181 gctacgacta gcctgtgtgg acgtctcctt caacaaggcc acggtggcca tctcagggtt

241 tctggtgac ctgcttcct gttcactgat cctattctcc tatgtcaca tagttgctgc

301 cattcttctg attccttctg cccagggaca ccgcaaagcc ttgggacct gcacgtctca

361 cctcactgtg gtttgcatt gctttggggc tacaatgttc acctacatga gacctgcggg

421 tggctcctcc ctggaaaagg agaatatgtt tgcctcttt tatgccattg tgattccaat

481 gctt (SEQ ID NO:323).

OR198

LOCUS AF179819 479 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus PPY117 pseudogene, partial sequence.

ACCESSION AF179819

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 479)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 479)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..479
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 gene <1..>479
 /gene="PPY117"
 /pseudo

BASE COUNT 100 a 115 c 91 g 173 t

ORIGIN

1 ttagccata tgcaaacct tatactatgt ggatcatatg agccgaagga cagcactgt
 61 ctggtaatg atctctggg ctgtgggctt ggtgcacaca ttaagccagt tatcattac
 121 tgtgaacctg cctttttgt ggacctaag tagtagacag cttttttgt gatcttctc
 181 gaggaccaa acttgctgc ctggactctt acctcattga aatactaatt gtggtcaata
 241 gtggagtctt ttccctaagc actttctgtc tcttggtcag ctctacac attattctg
 301 ttatggttg gctcaagtct tcggctgcaa tggcgaaggc atttctacg ctggcttccc
 361 atattgcagt agtaataata ttcttggac ctgcatctt catctatgt tggcccttta
 421 ccatctatcc ttggataaa ctcttgcca tattttacac tgtttcacc cccatccta (SEQ ID NO:324).

OR199

25 LOCUS AF179820 487 bp DNA PRI 31-DEC-2000
 DEFINITION Pongo pygmaeus olfactory receptor (PPY118) gene, partial cds.
 ACCESSION AF179820
 KEYWORDS .
 SOURCE orangutan.

30 ORGANISM Pongo pygmaeus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

35 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

40 TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487
 /organism="Pongo pygmaeus"
 /db_xref="taxon:9600"
 gene <1..>487
 /gene="PPY118"
 CDS <1..>487
 /gene="PPY118"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYATIMSQSQCVMLVAGSWVIACACALLHTLLARLS
 FCADHIIISHFFCDLGALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI

LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:325).

BASE COUNT 95 a 147 c 94 g 151 t
ORIGIN

5 1 tgtggccatc tgtcacccctc tacattatgc caccatcatg agtcagagcc agtgtgtcat
61 gctgtgggct gggctcctggg tcacgccttg tgcgtgtgct ctttgcata cctccttct
121 ggcccggtt tcctctgtg ctgaccacat catctctcac ttctctgtg acctgggtgc
181 cctgtcaag ctgtctgct cagacacctc cctcaatcag ttagcaatct ttacagcagg
241 attgacagcc attatgcttc cattcctgtg catcctgggt tcttatggc acattggggt
10 301 caccatcctc cagattcctc ccaccaaggg catatgcaa gcctgtcca cttgtggatc
361 ccacctctca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc
421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc
481 catgttg (SEQ ID NO:326).

15 OR200

LOCUS AF179821 475 bp DNA PRI 31-DEC-2000
DEFINITION Pongo pygmaeus PPY119 pseudogene, partial sequence.
ACCESSION AF179821

20 KEYWORDS

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Catarrhini; Hominidae; Pongo.

25 REFERENCE 1 (bases 1 to 475)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

30 REFERENCE 2 (bases 1 to 475)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers

source 1..475

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>475

/gene="PPY119"

/pseudo

BASE COUNT 98 a 119 c 104 g 154 t

ORIGIN

45 1 gtagccataa gcaaacctct ccactatgca atcatcatga actcatgcac atgtacaggc
61 ccagtggtag gctcttgggt cattgggggt atgcactccc tgagccagtt agctttcact
121 gtaagcttgc ccttctgtgg cccaacata gtggacagtt attattgcga ccttactttg
181 gtcacaaac gtgcctgtac agatgcttat atccctgaag tttgatgct ttggacgggt
241 ggtcttatgg gggtgacatc tttgctttt gctgatctcc tacacggtea ttctgattac
301 tgtgcagcga cattcctcag caggatatgc caaggctcac agcactctga ctgccacat
50 361 tgctgtgggt accgtgttct ttggccctg tatcttcac tatgcctggc ctttcagcaa
421 cttaccagt gataacattt tgctgtatt ctctgtagtt ttacaccta tatta (SEQ ID NO:327).

OR201

LOCUS AF179822 487 bp DNA PRI 31-DEC-2000

DEFINITION Pongo pygmaeus olfactory receptor (PPY120) gene, partial cds.

ACCESSION AF179822

KEYWORDS .

SOURCE orangutan.

ORGANISM Pongo pygmaeus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Catarrhini; Hominidae; Pongo.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Pongo pygmaeus"

/db_xref="taxon:9600"

gene <1..>487

/gene="PPY120"

CDS <1..>487

/gene="PPY120"

/codon_start=2

/product="olfactory receptor"

/translation="VAICHPLHYATTMSQSQCVMVLVAGSWVIACACALLHTLLLARLS
FCADHIIPHFFCDL GALLKLSCSDTSLNQLAIFTAGLTAIMLPFLCILVSYGHIGVTI
LQIPSTKGICKALSTCGSHLSVVTIYYGTIIGLYFLPPSSNTNDKNIIASVIYTVVTP
ML" (SEQ ID NO:328).

BASE COUNT 95 a 150 c 94 g 148 t

ORIGIN

1 tgtggccatc tgtcaccctc tacattatgc caccacatg agtcagagcc agtgtgtcat

61 gctggtggct gggctctggg tcacgcttg tgcgtgtgct ctttgcata cctccttct

121 ggcccggctt tccttctgtg ctgaccacat catccctcac ttcttctgcg acctggtgc

181 cctgctcaag ctgtctgct cagacacctc cctcaatcag ttagcaatct ttacgcagg

241 attgacagcc attatgcttc cattctgtg catcctgggt tcttatggtc acattggggg

301 caccatctc cagattcct ccaccaaggg catatgcaaa gccttggtcca ctgtggatc

361 ccaccttca gtggtgacta tctattatgg gacaattatt ggtctctatt ttctccccc

421 atccagcaac accaatgaca agaacataat tgcttcagtg atatacacag tagtcactcc

481 catgttg (SEQ ID NO:329).

OR202

LOCUS AF179823 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC184) gene, partial cds.

ACCESSION AF179823

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC184"
CDS <1..>487
20 /gene="SSC184"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLP
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
25 LRPVSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP
ML" (SEQ ID NO:330).

BASE COUNT 88 a 142 c 106 g 151 t
ORIGIN
1 tgttgccata tgttacccctc tccactacac tgccatcatg aggggaagggc tctgtgcctt
30 61 cttagtggtc gtatcttgga ttccatcttg tgctagctcc ctctctcaca cccttctgct
121 gacccecgctg cctttctgtg atgcaaacac cgtccaccac ttctctgtg acctgtgctg
181 cctgtcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtgtgtgtc attaccctgc catlcatgtg tatcctggta tcatatggct aactggggc
301 cactatcctg aggggtccct caaccaaagg gatccgcaaa gcgtgttcca tgtgtggctc
35 361 ccgtctctct gtggtgtctc tgtattatgg ctcaatatit ggccagtacc ttttccaac
421 tgaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc
481 catgctg (SEQ ID NO:331).

OR203

40 LOCUS AF179824 488 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC185) gene, partial cds.
ACCESSION AF179824
KEYWORDS .
45 SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 488)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 488)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers

source 1..488

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

10 gene <1..>488

/gene="SSC185"

CDS <1..>488

/gene="SSC185"

/codon_start=2

/product="olfactory receptor"

15 /translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS

FCDANTVHHYFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI

LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSSIDKDVIVALMYTVVTP

ML" (SEQ ID NO:332).

BASE COUNT 89 a 142 c 106 g 151 t

20 ORIGIN

1 ttgtgccata tgtaccctc tccactacac tgccatcatg aggggaagggc tctgtgcctt

61 cttagtggct gtatcttga tccatcttg tgctagctcc ctctctaca cccttctgct

121 gaccccgctg tcttctgtg atgcaaacac cgtccaccac tacttctgtg acctgtgctgc

181 cctgtccaag ctgtctgct cagatatctt cctcaacgag ctggtcatgt tcacagtagg

241 ggtggtgggc attaccctgc cattcatgtg tctcctggtg tcatatggct aactgggggc

301 cactatcctg agggctccct caaccaaagg gatccgcaa gcggtgtcca tgtgtggctc

361 ccgtctctct gtgtgtgtctc tgtattatgg ctcaatatt ggccagtacc tttcccaac

421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc

481 catgctgt (SEQ ID NO:333).

OR204

LOCUS AF179825 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC186) gene, partial cds.

35 ACCESSION AF179825

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

50 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487
 /gene="SSC186"
 CDS <1..>487
 /gene="SSC186"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VATCHPLRYMVIMNPCLCSLLILLSPLTSVVNALLLSLMVLRSL
 FCTDLEIPLFFCELAQVIQLACSDTLINNILIYFAACIFGGVPLSGIIFSQAQIASSI
 LRMP SAR RYKAFSTCGSHLSMVLLFYRTGLGVYISSAVTDSPRKTAVASMMYSVGPQ
 MV" (SEQ ID NO:334).

BASE COUNT 92 a 126 c 105 g 164 t

ORIGIN

1 tgtggccact tgcaccccc ttagatacat ggtcatcatg aaccctgcc tctgcagcct
 61 gctgattctt cttctccgt tgactagcgt tgtgaatgcc cttcttca gcctgatggt
 121 gttgaggctg tcctctgca cagatctgga aatcccgctc ttctctgtg aactggctca
 181 ggtcatccag ctgcttctg ctgacaccct catcaataac atcctgatat atttgcagc
 241 ttgcatattt ggtggtgttc ctctgtctgg aatcatatc tctatgctc agattgcctc
 301 ctctattttg agaatgccat cagcacgcag aaagtataaa gcctttcca cctgtgggtc
 361 tcacctctec atgtgtctct tgtctatag gacagggttg ggggtgtaca ttagttctgc
 421 agttactgac tcacctagga agactgcagt ggcttcaatg atgtattctg tgggtcctca
 481 aatggtg (SEQ ID NO:335).

OR205

LOCUS AF179826 487 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri sciureus olfactory receptor (SSC187) gene, partial cds.

ACCESSION AF179826

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487

/gene="SSC187"

CDS <1..>487

/gene="SSC187"

/codon_start=2

/product="olfactory receptor"

/translation="VAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLMARLR

FCADNVILHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLIIGSYARIVFSI

LKVPSSKGICKAVSTCGSHLSVVSIFYGTVIGLYLCPSANNSTLKETVMAVVMYTVMAP
ML" (SEQ ID NO:336).

BASE COUNT 84 a 140 c 104 g 159 t
ORIGIN

5 1 cgtggccatc tgcctcccc tacattacgc caccatcatg agcccatgc tgtctcgctc
61 cctgggtggcg ctgtctctggg tgctgaccac ctccatgcc atgtgcaca ctttactcat
121 ggccagggtg cgttttctg cagacaatgt gatcctccac ttttctgtg atatgtctgc
181 tctgctgaag ctggcctgct ctgacactcg agttaatgaa ttggtgatat ttatcatggg
241 aggcctcatt ctgtcatcc catttctact tatcattggg tctacgcac gaattgtctt
10 301 ctccatcctc aaggctccctt ctctaaggg tatctgcaag gccgtctcta ctgtggctc
361 ccacctctct gtggtgtcac tgtctatgg gactgttatt ggtctctact tatgcccac
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tgatggcccc
481 catgctg (SEQ ID NO:337).

15 OR206

LOCUS AF179827 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC190) gene, partial cds.
ACCESSION AF179827

20 KEYWORDS

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

25 REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

30 REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

35 FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487

40 /gene="SSC190"

CDS <1..>487

/gene="SSC190"

/codon_start=2

/product="olfactory receptor"

45 /translation="VAICKPLHYTTIMSSKICQLVLGCWVLGFLIIFPPLLGLNLD

FCASNVDHFYFDTIPLLQISCTDTQLLERMGFISALVTLLVTLVMVIISYTYIALTI

LKIPSTSQRKKAFTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSKGISVLNTSVAP

LL" (SEQ ID NO:338).

BASE COUNT 112 a 124 c 91 g 160 t

50 ORIGIN

1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
61 gcttgtgctt ggggtgctggg ttcttggtt tctcatcatc ttccaccac tctcttagg
121 actaaatctt gactctgtg cctccaacgt cggtgatcat ttctacttg acactatccc
181 gctcctgcag atttctgtca cagacacgca gctcctggag aggatgggat tcactcagc

241 gttggtgaca ctcttagtca cattggtaat ggtgataata tcatatactt atattgccct
 301 gacaattcta aaaatccctt caactagtca gaggaaaaag gcttttcca cgtgttcttc
 361 tcacatgatt gtgatatccc ttcttatgg cagctgcac tcacgtatg ttaagccatc
 421 agtcaacaa agggatatct ttcaaaggg aatttcggtg ctcaatacct ctgttgctcc
 481 acttttg (SEQ ID NO:339).

OR207

LOCUS AF179828 485 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC191) gene, partial cds.

ACCESSION AF179828

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 485)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..485

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>485

/gene="SSC191"

CDS <1..>485

/gene="SSC191"

/codon_start=1

/product="olfactory receptor"

/translation="VAICHPLQYSVIMTTGYCGQLVAFSYMSGFMISVIKVVYFISHVA

FCGSNVMNHFFCDISPVLKLACKDMSTAELVDFALAIVILVIPLITLTSYIYIVSAI

LHIPSTQGRKKAFSTCASHLTVVIIIFYTAMIFTYVRPRAIASFNSNKLMSAVYAVLTP

ML" (SEQ ID NO:340).

BASE COUNT 111 a 134 c 80 g 160 t

ORIGIN

1 gtggccattt gccaccctct tcaatactca gtcacatga ccacaggta ctgtggacag

61 ctggtggctt tctcttcat gagtggttc atgatctctg tcatcaaggc ctatttcatt

121 tcacatgttg ctttctgtgg ctccaatgtt atgaaccact ttttctgtga tatctacca

181 gtctctaaac tggcatgcaa agacatgtcc acagctgagc tagtggactt tgcttagct

241 atcgtcatc ttgtgatccc tctcattacc actatctctt cctatatcta cattgtctcc

301 gccattctgc atataccctc caccaggga aggaagaagg ccttctccac ctgtgcatct

361 caccctactg tagtcataat ttttacaca gccatgatt ttacatagt tcggcccaga

421 gctattgcat catttaattc caacaacta atgtcagctg tgtatgcagt cctcacacc

481 atgct (SEQ ID NO:341).

OR208

LOCUS AF179829 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC192) gene, partial cds.

ACCESSION AF179829

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri sciureus"

/db_xref="taxon:9521"

gene <1..>487

/gene="SSC192"

CDS <1..>487

/gene="SSC192"

/codon_start=2

/product="olfactory receptor"

/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS

FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPMCILVSYGYTGATI

LRVPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSIDKDVIVALMYTVVTP

ML" (SEQ ID NO:342).

BASE COUNT 88 a 141 c 106 g 152 t

ORIGIN

1 tgttgccata tgttaccctc tcactacac tgccatcatg agggaagggc tctgtgcctt

61 cttagtggct gtatcttggg ttccatcttg tgctagctcc ctctctcaca ccttctgct

121 gaccccgctg tctttctgtg atgcaaacac cgtccaccac ttctctgtg accttgctgc

181 cctgctcaag ctgtctctct cagatatctt cctcaatgag ctggctcatg tcacagtagg

241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct aactgggggc

301 cactatcctg aggggtccctt caaccaaagg gatccgcaaa gcgttgcca tgtgtggctc

361 ccgtctctct gtgtgtgtctc tgtattatgg ctcaatattt ggccagtacc ttttccaac

421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta atgtacacag tggtcacacc

481 catgctg (SEQ ID NO:343).

OR209

LOCUS AF179830 487 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri sciureus olfactory receptor (SSC193) gene, partial cds.

ACCESSION AF179830

KEYWORDS .

SOURCE common squirrel monkey.

ORGANISM Saimiri sciureus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.

10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri sciureus"
/db_xref="taxon:9521"
gene <1..>487
/gene="SSC193"
CDS <1..>487
20 /gene="SSC193"
/codon_start=2
/product="olfactory receptor"
/translation="VAICYPLHYTAIMREGLCAFLVAVSWIPSCASSLSHTLLLTPLS
FCDANTVHHFFCDLAALLKLSCSDIFLNELVMFTVGVVVITLPFMCILVSYGYTGATI
25 LRPSTKGIRKALSMCGSRLSVVSLYYGSIFGQYLFPTVSSIDKDVIVALTYTVVTP
ML" (SEQ ID NO:344).

BASE COUNT 88 a 143 c 106 g 150 t
ORIGIN
1 tgttgccata tgttacccctc tccactacac tgccatcatg agggaagggc tctgtgcctt
30 61 cttagtggtc gtatcttggg ttccatcttg tgctagctcc ctctctcaca cccttctgct
121 gacccecgctg tctttctgtg atgcaaacac cgteccaccac ttctctgtg accttgctgc
181 cctgctcaag ctgtcctgct cagatatctt cctcaatgag ctggtcatgt tcacagtagg
241 ggtggtggtc attaccctgc cattcatgtg tatcctggta tcatatggct acactggggc
301 caccatcctg aggggtccctt caaccaaagg gatccgcaaa gcgtgtgcca tgtgtggctc
35 361 ccgtctctct gtggtgtctc tgtattatgg ctcaatatgt ggccagtacc ttctccaac
421 tgtaagcagt tccattgaca aggatgtcat tgtggctcta acgtacacag tggtcacacc
481 catgctg (SEQ ID NO:345).

OR210

40 LOCUS AF179831 486 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri sciureus olfactory receptor (SSC194) gene, partial cds.
ACCESSION AF179831
KEYWORDS .

45 SOURCE common squirrel monkey.
ORGANISM Saimiri sciureus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 486)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 486)

gene <1..>487
 /gene="SSC195"
 CDS <1..>487
 /gene="SSC195"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICNPLLYMVTMSPQVCLLLLLGVYGMGVLGAVAHMGNIMFMT
 FCSENLVNHYMCDVLPLELSCNSSYINLLLVFIIVAIGIGVPIVTIFISYGFILSSI
 LHISSTEGRSKAFSTCSSHIIIVVSLFFGSGAFMYLKPPSILPLDQGVSSIFYTAVVP
 MF" (SEQ ID NO:348).

BASE COUNT 92 a 116 c 105 g 174 t
 ORIGIN

1 cgtggccatc tgtaaccac tgctgtacat ggccaccatg tctcccagg tgtgcttgct
 61 cctttgttg ggtgtctatg ggatgggggt ttgggggct gtggctcata tgggaacat
 121 aatgtttatg accctttgtt cagaaaaatc tgtcaatcac tacatgtgtg atgtccttcc
 181 cctccttgag ctctcctgca acagctctta cataaattg ctgttggtt ttattattgt
 241 ggccattggc attgggggtgc caattgtcac cattttatc tcttatggtt ttattcttc
 301 cagcattctc cacattagct ccacagaggg cagggtctaa gccttcagta cctgcagctc
 361 ccacataatt gtggatgcg tttctttgg gtcaggagct ttatgtacc tcaaaccacc
 421 ttctattcta ccctggacc aggggaaagt gtctccatt ttatatactg cagtgtgtgc
 481 catgttt (SEQ ID NO:349).

OR212

LOCUS AF179833 486 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri boliviensis SBO213 pseudogene, partial sequence.
 ACCESSION AF179833
 KEYWORDS .
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 486)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..486
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>486
 /gene="SBO213"
 /pseudo

BASE COUNT 107 a 151 c 87 g 141 t
 ORIGIN

1 cgtggccatc tgccaccctc tccactatcc catccgcatg agtagaagtg tgtgtgtgaa
 61 gatgattgga ggctcttggg cgctgggggc catcaactcc ttggcacaca cagtctatgc
 121 cctccatatt ccctactgca ggtctagagc cattgaccat ttctctgcg acatcccagc

181 catgttgct ctcgctgta cggacacttg ggtctatgaa tacatggttt ttctaagtac
 241 aagctgcctt ctctcttctt ttctctggc atcaccgctt cctatggccg agtctctatt
 301 gctgtctacc atacgcattc aaaaaaggga agaaaaagg cctccaccac catttcaacc
 361 catttaactg tagtgatctt ttactatgca cctttgtct acacctatct tcggcccagg
 421 aatctccact caccatccga agacaagatc ctggcagtct tctacacat ccttaccct
 481 atgctc (SEQ ID NO:350).

OR213

LOCUS AF179834 487 bp DNA PRI 31-DEC-2000
 DEFINITION Saimiri boliviensis olfactory receptor (SBO214) gene, partial cds.
 ACCESSION AF179834
 KEYWORDS .
 SOURCE Bolivian squirrel monkey.
 ORGANISM Saimiri boliviensis
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
 REFERENCE 1 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE The olfactory receptor gene repertoire in primates and mouse:
 Evidence for reduction of function in primates
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 487)
 AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
 FEATURES Location/Qualifiers
 source 1..487
 /organism="Saimiri boliviensis"
 /db_xref="taxon:27679"
 gene <1..>487
 /gene="SBO214"
 CDS <1..>487
 /gene="SBO214"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICKPLHYTTIMSSKICLQLVLGCWVLGFLIIFPPLLGLNLD
 FCASNVVDHFYCDTIPLLQISCTDTQLLERMGFISALVTLLVTLVMVHISYTYIALTI
 LKIPSTSQRKKAFSTCSSHMIVISLSYGSCIFMYVKPSVKQRVSFSGISVLNTSVAP
 LL" (SEQ ID NO:351).
 BASE COUNT 112 a 125 c 92 g 158 t
 ORIGIN
 1 tgtggccatc tgtaagcccc tgcattacac caccatcatg agcagcaaaa tctgcctgca
 61 gcttgtgctt ggggtctggg ttcttggtt tctcatcacc ttccaccac tctctctagg
 121 actaaatctt gacttctgtg cctccaacgt cgttgatcat ttctactgtg acactatccc
 181 gctcctgcag atttctgtca cagacacgca gtcctggag aggatgggat tcatctcagc
 241 gctggtgaca ctctagtca cattggtaat ggtgataata tcatatactt atattgcct
 301 gacaattcta aaaatccctt caactagtca gaggaanaag gcttttcca cgtgttcttc
 361 tcatatgatt gtgatafccc ttcttatgg cagctgcac tcatgtatg ttaagccatc
 421 agtcaaacaa agggtatctt ttcaaaggg aatttcggtg ctcaatacct ctgttgctcc
 481 acttttg (SEQ ID NO:352).

OR214

LOCUS AF179835 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO215) gene, partial cds.
5 ACCESSION AF179835
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
25 gene <1..>487
/gene="SBO215"
CDS <1..>487
/gene="SBO215"
/codon_start=2
30 /product="olfactory receptor"
/translation="VAICFPLHYTLLMSHSICVNTVIVCWSISIAGALIYTVFTLHLP
YCGPYKINHFFCEVPAVLKLACADTSFNDRDLFILGFLLLVPLSFILASYVLIFASI
FRIRSVQGRLKSFSSTCASHVTVVTMFYGPAIIMYMRPGSWYDPEWDKKVEVLNVISA
FL" (SEQ ID NO:353).
35 BASE COUNT 86 a 142 c 104 g 155 t
ORIGIN
1 cgttgccatt tgcctccccc ttactatac gctactcatg agccattcca ttgtgtcaa
61 cacggtcatt gtctgttggt ccattagcat agctggggcc ctgatctaca ctgtcttcac
121 ctgcatctg ccttattgtg gccctacaa gataaaccac ttctctgtg aggtccctgc
40 181 tgtcctgaag ttggcctgtg cagacacatc tttaatgac aggctggact tcattttggg
241 ttctctctg cttttgttc cactctcct catcctggcc tctacgtac tcactttgc
301 ctctatctc agaatccgct cagtgcaggg gaggtcaag tcctctcca cgtgtgcttc
361 ccacgtcact gtgtgcacca tgttctacgg accggccatc atcatgtaca tgaggcccgg
421 ttcttggtat gaccagagt gggacaagaa ggtagaggtg ttgtacaatg tcactctgc
45 481 cttcttg (SEQ ID NO:354).

OR215

LOCUS AF179836 487 bp DNA PRI 31-DEC-2000
50 DEFINITION Saimiri boliviensis olfactory receptor (SBO216) gene, partial cds.
ACCESSION AF179836
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
/gene="SBO216"
CDS <1..>487
20 /gene="SBO216"
/codon_start=2
/product="olfactory receptor"
/translation="VAICQPLHYSTLLSPQACMTMVGTSWLTGIITATTHASLIFSLP
25 FPSHPMIPHFLCDILPVLRLASAGKHRSEISVMTATVVFIMVPFSMIVTSYIRILGAI
LAMTSTQSRHKVFSTCSSHLLVVCLFFGTASITYIRPQAGSSVTTDRILSLFYTVITP
ML" (SEQ ID NO:355).
BASE COUNT 93 a 186 c 89 g 119 t
ORIGIN
1 tgttgccatc tgccagcccc tgccactact caccctcttg agccacaggg cctgcatgac
30 61 catgggtgggc acctctctggc tcacaggcat catcacagcc accacccatg cctccctcat
121 cttctctctg ccttccccca gccaccaat gatcccacac ttctctgtg acatcctgcc
181 agtactgaga ctggcaagtg ctgggaagca caggagtgg atctccgtga tgacagctac
241 cgtagtcttc atcatggtcc ctttctctat gattgtcacc tcttacatcc gcatcctggg
301 tgccatccta gcaatgactt ccaccagag cggccacaag gtcttctcca cctgtctctc
35 361 ccactctgct gtggtctgtc tcttcttgg aacagccagc atcacctaca tacggcccca
421 ggaggtctcc tctgtacca cagaccgcat cctcagtctc ttctacacgg tcatcacacc
481 catgctc (SEQ ID NO:356).

OR216

40 LOCUS AF179837 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO217) gene, partial cds.
ACCESSION AF179837
KEYWORDS .
45 SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..487

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

gene <1..>487

/gene="SBO217"

CDS <1..>487

/gene="SBO217"

/codon_start=2

/product="olfactory receptor"

/translation="VAICHPLYYSTVMSPQVCALILVLCWVLTNVVALTHLLMARLS

FCVTGEIAHFFCDITPVLKLSCDTHNEMMVFLVGGTVLIIPFLCIVTSYIYIVPAI

LRVRTHGGAGKAFSTCSSHLICIVCFYGTLFSAYLCPPSIASEDKDIATAAMYTIVTP

TL" (SEQ ID NO:357).

BASE COUNT 89 a 151 c 100 g 147 t

ORIGIN

1 tgtggccatt tgccacccc tctactactc cacagtcacg agccccaag tctgtgccct

61 aatcctcgtg ttgtgctggg tcctcaccaa cgttgtgcc ttgaccaca cactcctcat

121 ggctcgactg tcctctgtg tgactgggga aattgctcac tttctgtg acatcactcc

181 tgtctgaag ctatcatggt ctgacacca catcaatgag atgatggtt ttgtctggg

241 aggcacagta ctcacatcc ctttctatg cattgtcacc tcctacatct acattgtgcc

301 tgctattctg agggctccgaa cccatgggtg ggcgggcaag gcctttcca cctgcagttc

361 ccacctctgc attgtttgtg tttctatgg gacctcttc agtgectacc tgtgtcctcc

421 ctccatcgcc tctgaagata aggacattgc aacagc:gca atgtatacca tagtgactcc

481 cacgttg (SEQ ID NO:358).

OR217

LOCUS AF179838 486 bp DNA PRI 31-DEC-2000

DEFINITION Saimiri boliviensis olfactory receptor (SBO218) gene, partial cds.

ACCESSION AF179838

KEYWORDS

SOURCE Bolivian squirrel monkey.

ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE The olfactory receptor gene repertoire in primates and mouse:

Evidence for reduction of function in primates

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 486)

AUTHORS Giorgi,D.G. and Rouquier,S.P.

TITLE Direct Submission

JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR

1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers

source 1..486

/organism="Saimiri boliviensis"

/db_xref="taxon:27679"

OR220

LOCUS AF179841 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO221) gene, partial cds.
5 ACCESSION AF179841
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
10 Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.
REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
15 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
20 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France
FEATURES Location/Qualifiers
source 1..487
/organism="Saimiri boliviensis"
/db_xref="taxon:27679"
25 gene <1..>487
/gene="SBO221"
CDS <1..>487
/gene="SBO221"
/codon_start=2
30 /product="olfactory receptor"
/translation="VAICLPLHYATIMSPMLSRSLVALSWVLTTFHAMLHTLLIARLR
FCADNVIFHFFCDMSALLKLACSDTRVNELVIFIMGGLILVIPFLLIIGSYARIVFSI
LKVPSSKGICKAVSTCGSHLSVVSIFYGTVIGLYLCPANNSTLKETVMAVMTVMAP
ML" (SEQ ID NO:364).
35 BASE COUNT 85 a 139 c 103 g 160 t
ORIGIN
1 cgtggccatc tgctccccc tacattacgc caccatcatg agcccatgc tgtctcgtc
61 cctggggcgc ctgtctggg tgctgaccac ctccatgcc atgtgcaca cttactcat
121 agccaggttg cgttttgtg cagacaatgt gatctccac ttttctgtg atatgtctgc
40 181 tctgctgaag ctggcctgct ctgacctcg agttaatgaa ttggtgatat ttatcatggg
241 aggcctcatt ctgtcatcc cattctact tatcattggg tctacgcac gaattgtctt
301 ctccatctc aaggccctt ctctaaggg tatctgcaag gccgtctcta ctgtgggctc
361 ccacctctct gtgtgtgtcac tgtctatgg gactgttatt ggtctctact tatgcccatc
421 agctaataat tctactctaa aggagactgt catggctgtg atgtacactg tgatggcccc
45 481 catgctg (SEQ ID NO:365).

OR221

LOCUS AF179842 487 bp DNA PRI 31-DEC-2000
50 DEFINITION Saimiri boliviensis olfactory receptor (SBO222) gene, partial cds.
ACCESSION AF179842
KEYWORDS .
SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
5 TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 487)
AUTHORS Giorgi,D.G. and Rouquier,S.P.
10 TITLE Direct Submission
JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

FEATURES Location/Qualifiers
source 1..487
15 /organism="Saimiri boliviensis"
/db_xref="taxon:27679"
gene <1..>487
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CDS <1..>487
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/codon_start=2
/product="olfactory receptor"
/translation="VAICNPLLYMVTMSPQVCLLLLGVYGMGVLGAVAHTGNIVFLT
FCAGNLVNHYMC DILP LLELSCNGSYINVLVIFIVVTIGIGVPIVAIFISYGFILSSN
25 LHISSAEGRSKAFSTCSSHIIAVSLFFGSGAFMYLKPSSVLPDQGVSSLFYTIVVP
MF" (SEQ ID NO:366).

BASE COUNT 86 a 120 c 105 g 176 t
ORIGIN
1 cgtggccatc tgtaaccac tgctgtacat ggtcaccatg tctcccagg tgtgtttgct
30 61 cctttgttg ggtgtctatg ggaagggggt ttgggggct gtggctcata caggaaatat
121 agtgtttcta accttttg gaggcaacct tgtcaatcac tacatgtgtg acatccttc
181 ccttcttgag ctctcctgca atggctctta cataaatgtt ctgtcatct ttattgttg
241 gaccattggc attgggtgc ccattgtgc cattttacc tcttatggtt ttattcttc
301 cagcaatc caccattgtt ctgtgaggg caggctctaa gccttcagta cctgcagctc
35 361 ccacataatt gcagtttctc ttttctcgg gtcaggagct ttatgtacc tcaaaccctc
421 ttccgttta ccctggacc aggggaaagt atcctccctg tttatacta ttgtgtgcc
481 catgttt (SEQ ID NO:367).

OR222

40 LOCUS AF179843 487 bp DNA PRI 31-DEC-2000
DEFINITION Saimiri boliviensis olfactory receptor (SBO223) gene, partial cds.
ACCESSION AF179843
KEYWORDS .

45 SOURCE Bolivian squirrel monkey.
ORGANISM Saimiri boliviensis
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Primates; Platyrrhini; Cebidae; Cebinae; Saimiri.

REFERENCE 1 (bases 1 to 487)
50 AUTHORS Giorgi,D.G. and Rouquier,S.P.
TITLE The olfactory receptor gene repertoire in primates and mouse:
Evidence for reduction of function in primates
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 487)

AUTHORS Giorgi,D.G. and Rouquier,S.P.
 TITLE Direct Submission
 JOURNAL Submitted (24-AUG-1999) Institut de Genetique Humaine, CNRS, UPR
 1142, rue de la Cardonille, Montpellier Cedex 5 34396, France

5 FEATURES Location/Qualifiers
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 gene <1..>487
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 CDS <1..>487
 /gene="SBO223"
 /codon_start=2
 /product="olfactory receptor"
 /translation="VAICHPLHYTVTINPRLCGLLVLASWILSALNSSLQTLIVLRLS
 15 FCTDLEIPHFFCELNQVIHLACYDTFLNDVVMYLAAMLLGGGPLTGHYSYSKIVSSI
 RAISSAQGKYKAFSTCASHILIVSLFYGTLLGVYLSSAATGNSSHSSAAALVMYTVVTP
 ML" (SEQ ID NO:368).

BASE COUNT 101 a 134 c 98 g 154 t

ORIGIN

1 tgtggccatc tgcacccccc tgcactacac agtcaccatt aaccccagac tgtgtggact
 61 gctggttctg gcatcctgga tcctgagtcg cctgaattcc tcattacaaa ccttaatagt
 121 gctgcggctt tcctctgca cagacttgga aatccccac ttttctgcg aactaatca
 181 ggcatcatat ctgacctgtt atgacacttt ccttaatgat gtggtgatgt atttggcagc
 25 241 tatgtgctg ggcggtggc cctcacagg aattattac tctactcta agatagtttc
 301 ctccatacgt gcaatctcat cagctcaggg gaagtacaag gcgtttcca cctgtgcatc
 361 tcacatctta attgtctct tatttatgg tacactccta ggtgtgtacc ttagttctgc
 421 tgcaactggc aatcacatt caagtgtgc agccttggtg atgtacactg tggtcacccc
 481 catgctg (SEQ ID NO:369).

OR223

LOCUS AF073959 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR1-72M15 olfactory receptor gene,
 partial cds.

35 ACCESSION AF073959

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

40 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

45 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 50 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR1-72M15"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="IADIGFTSTTIPKVLQTIHTQSKFISFSGCITQIFFFIVFGCLD
 NLLSVMA YDRFVAICHPLHYVVMNSCFVMLALGSWIVSVMSSLPETLTVLRLSFC
 TNMEIPHFCDLPEVLKLACSDTLVNNIVTYSITIVIAGFPFSGILLSYSKIFSSILR
 IPSAGGKYKAFSTCGSHLLVFLFYSNGLGVYLSSAATSSSRMSLVASLMYSIVTP" (SEQ ID
 NO:370).
 BASE COUNT 139 a 171 c 119 g 220 t
 ORIGIN

1 catagctgac atcggttca cctccaccac tatccccaag gttctgcaga ctatccacac
 61 acagagcaaa ttcatctctt tctcgggctg catcacacag atattttct tcatgtgtt
 121 tggatgcctg gacaatttac tctatcagt gatggcctat gaccgcttg tggccatctg
 181 ccatcccttg cactatgttg tcatcatgaa ttcttgcttc tgtgtgatgc tggctcttgg
 241 atcatggata gtcagcgtca tgagttccct acctgagacc tfgactgtgt taagactatc
 301 cttctgtaca aacatggaaa ttccacactt ttctgtgat ctcccgaag tcctgaagct
 361 tgcctgttct gacacccttg ttaataacat tgtgacatat tctataacca tagtcatagc
 421 tggtttccca ttctctggga ttctattgtc ttattctaag attttcct ccatcctaag
 481 aattccttca gctgggggca agtacaaagc cttttctacc tgtgggtctc atcttttgg
 541 ggtcttctta ttctatagca atggtcttgg ggtctacctc agctctgcag ccacatcctc
 601 ttctagaatg agtctagtgt cctcactgat gtacagcata gtcactccc (SEQ ID NO:371).

OR224

LOCUS AF073960 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR1-72M16 olfactory receptor gene,
 partial cds.
 ACCESSION AF073960
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers
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 /sub_species="domesticus"
 /db_xref="taxon:10092"
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 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
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 SLLVAMAYDRYVAICFPLHYTSIMSPKLCLCLVALSWLLTTVISLSHTLLMARLSFC
 ANNVIPIHFFCDMSALLKLACSDIQINKLMIFILGGLVIIVPFLLIFSSYARIVSSILK
 VPSSRSIRKAFSTCGSHLSVVSFLFYGTIIGLYLRPSANNSTIKETVMAVMYTVVTP" (SEQ ID

NO:372).
 BASE COUNT 129 a 184 c 120 g 216 t
 ORIGIN

1 cttctctgac ttctgctttt cctctgtgac cattcccaaa ttgctgcaga acatgcaaag
 61 ccaagtcca tccataccct atgcagggtg cctggcacia atgtactttt tctgctttt
 121 tgcagatctc gagagcttcc tccttgtggc catggcctat gatcgctatg tggccatctg
 181 ctcccccta cactatacta gcatcatgag cccaagctg tgtctctgcc tgggtggcact
 241 atcttggtga ctgaccacag tcattctttt gtcacacaca ctgctcatgg ctggtgcttc
 301 cttctgtgct aacaatgtga ttctcactt ttctgtgat atgtcagctc ttctgaagtt
 361 agcctgctct gacattcaga tcaataagtt gatgatattt atctgggag gactgtcat
 421 tattgtcca ttctgtctga tattttcatc ctatgcacga atagtgtcct ccatttcaa
 481 ggtccctct tctagaagca tccgcaaggc cttctccacc tgtgtgtccc acctctctgt
 541 ggtgtctctt ttctatggga caatcattgg tctctatta cgtccatcag ctaataattc
 601 aaccattaag gagactgtca tggctgtgat gtacacgggtg gtgaccctt (SEQ ID NO:373).

OR225

LOCUS AF073961 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR10M olfactory receptor gene,
 partial cds.
 ACCESSION AF073961
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,

France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR10M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDLCFSSVTMPKLLQNMQSQDSSITYAGCLTQMYFFLLFGDLE
 SFLLVAMAYDRYVAICFPLHYMSIMSPSLCVSLVLLSWVLTTFHAMLHTLLMARLSFC
 EDNVIPHFFCDMSALLKLSCSDTHVNELVIFVTGGLLVIPFVLILVSYARIVSSILK
 VPSARGIRKAFSTCGSHLSVVSIFYGAIIGLYLCPADNSTVKETVMAMMYTVVTP" (SEQ ID
 NO:374).

BASE COUNT 120 a 185 c 141 g 203 t

ORIGIN
 1 cttctctgat cttctgtttt cctctgtcac aatgccc aaa ttgctgcaga acatgcagag
 61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtactttt tcttgctctt
 121 tggagacctt gagagcttcc tcttgtggc catggcctat gaccgctatg tggccatctg
 181 ctccccctt cattacatga gcatcatgag cccagcctc tgtgtgagtc tgggtgctgt
 241 gtctctgggtg ctgaccactt tccatgccat gctgcatacc ctgctcatgg ccagattgtc
 301 attctgtgag gacaatgtga tccccactt ttctgtgac atgtctgctc tgcagaagct
 361 gtctctgtct gacactcacg ttaatgaatt ggtgatattt gtcacaggag gcctgatcct
 421 tgcattcca ttgtgtcga tcttgtgtc ctatgcacga attgtgtcct ccattctcaa
 481 ggtcccgtct gctcgaggca tccgtaaagc cttctccacc tgtgggtccc acctgtctgt
 541 ggtgtcactg ttctatgggg caatcattgg tctgtactta tgtccatcag ctgataactc
 601 tactgtgaag gaaactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:375).

OR226

LOCUS AF073962 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR11M olfactory receptor gene,
 partial cds.
 ACCESSION AF073962
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers
source 1..649
5 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR11M"
mRNA <1..>649
10 /product="olfactory receptor"
CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
15 /translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYGGCLAQIFFFMLFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKVCTFLVLLLWILTPHATMQILLTVRLSFC
ENNVFLNFFCDIFVLLKLACSDTYVNDLMILIMGGLIIVIPFLLIVISYARIISSTLK
VPSTQGIHKVFSTCGSHLSVVSIFYGTIIGLYLCPSGNNFSLKGSAMAMMYTVVTP" (SEQ ID

NO:376).

20 BASE COUNT 143 a 160 c 122 g 224 t

ORIGIN

1 tttctctgac ctctgctttt cctctgtcac aatgccc aaa ttgctgcaga atatgcagag
61 ccaggaccca tccatccct atggagggtg cctggcacia atattcttct ttatgctttt
121 tggagacatg gaaagcttc ttctgttagc catggcctat gaccgctatg tggccatctg
25 181 cttccctctg cattacacta gcatcatgag tctaaggctc tgtacttttc tagtgctact
241 gttgtggata ctgacaacac cacatgccac aatgcaaatt ctgtcacacg taagactgtc
301 ttttgtgag aacaatgtgt ttctcaactt ttctgtgac atattgttc tctaaagct
361 ggcctgctca gacacttatg ttaatgattt gatgatactt atcatgggag ggctcatcat
421 tgtattcca ttctgtctca ttgttatatc ctatgcaagg atcatctcct ctactcttaa
30 481 ggttccatct actcaaggca tccacaaggc cttctctacc tgtggctctc atctgtctgt
541 ggtgtctctg ttctatggga caattattgg tctctactta tgtccatcag gtaataattt
601 cagtctaaag gggctctgcc tggctatgat gtacacagtg gtgactccc (SEQ ID NO:377).

OR227

35 LOCUS AF073963 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR12M olfactory receptor gene,
 partial cds.

ACCESSION AF073963

40 KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

45 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

JOURNAL Unpublished

50 REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers
5 source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR12M"
10 mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2
15 /product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQSQDTSISYAGCLTQMYFLLVFGDLE
SILLLVMA YDRYVAVCFPLHYMSIMPTLCVCLLVLSWVFTVLYSMLHTLLLSRLSFC
EDNLIHHFFCDISALLKLACSDIHINELMIFIMGGLVSIIPFLLIVVSYIQIVYSILK
ISSAHVLHKIFSTCGSHLSVVSIFYGTIFALYLCP SANNSTVKEISMAMMCTVVTP" (SEQ ID

NO:378).
BASE COUNT 134 a 159 c 122 g 234 t
ORIGIN

1 ctctctgat ctctgctttt cctctgtcac aatgcccaag ttgtacaga acatgcagag
61 ccaggacacg tccatctcct atgctggctg tctgacacaa atgtactttt tattggttt
25 121 tggagacctg gagagcatcc ttcttttggc catggcttat gaccggatg tggtgtctg
181 ctccccctt cattacatga gcatcatgag cccacacact tgtgtgtgtc tgctagtgtt
241 atctctggga ttactgtgc tgtatttat gtgcacact ctactctgt ctagattgtc
301 attctgtgag gataactga tccaccactt ttctgtgac atatctgccc tgctcaagtt
361 ggcttgctct gacattcata ttaatgaatt aatgatattt atcatgggag ggcttgtag
30 421 catcatcca ttctactca ttgtgtgtc ctatatacaa attgtctact ccattctaaa
481 gatttcatct gctcatgttt tacacaagat ctctccacc tgtgggtccc acctgtctgt
541 agtctcactg tctatggga caattttgc tctctactta tgtccatcag ctaataactc
601 tactgtgaag gagatttcca tggccatgat gtgcacagtg gtgactccc (SEQ ID NO:379).

OR228

LOCUS AF073964 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR15-71M19 olfactory receptor gene,
partial cds.
40 ACCESSION AF073964
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
45 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
50 JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

5 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR15-71M19"
 10 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDIGFISTTIPKMLVNIQTQSKSISYAECITQIYFFMLFGGMD
 15 ILLLTVMAYDRFVAICHPLHYSVIMNPQLSGLLVLVSWFISFSYSLIQSLLMLRLSFC
 TNQIIKHFYCEYSRALTIACSDTLINHILLYILICVLGFIPFSGILYSYCKIVSSILR
 20 IPSTDGKYKAFSTCGSHLSVVSLFYGTGLGVYLSSDVTSSSGKDVVASVMYTVVTP" (SEQ ID
 NO:380).
 BASE COUNT 153 a 151 c 112 g 233 t
 ORIGIN

1 cttttctgac attggttca tctctacaac tatccctaag atgttggtga atatccaaac
 25 61 acagagcaag tccatctcct atgcagaatg catcaccagc attattttt tcatgctctt
 121 tggaggcatg gacatacttc tctcaccgt gatggcctat gaccgatttg tggccatctg
 181 tcacccctt cactattcag tcattatgaa tccccaacta agtggettgc tggttcttgt
 241 atcatggtt attagctttt catattctct gatacagagt ctattgatgc tgcggttgtc
 301 ctctgtaca aatcagataa ttaaacactt ttactgtgaa tattctagag ccctcactat
 361 agcctgctca gacacactaa tcaatcatat ccttctttat attctgatat gtgtccttgg
 421 ctctacccct ttctcaggga tcctttatc atactgaaa attgttctt ctattttgag
 481 aattccatca acagatggaa aatataaagc attttctacc tgtgggtctc atctatcagt
 541 ggtttcttta ttctatggga caggccttgg tgtgtacctt agttctgatg taacttcctc
 601 ctctgggaag gacgtggtgg cctcagtaat gtatacagtg gtcaccctc (SEQ ID NO:381).

OR229

LOCUS AF073965 643 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR15-71M20 olfactory receptor gene,
 40 partial cds.
 ACCESSION AF073965
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 45 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 643)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 50 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 643)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers
 source 1..643
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR15-71M20"
 mRNA <1..>643
 /product="olfactory receptor"
 CDS <1..>643
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDLCFSSVTVPKLLKDLSAKKTISIEGCLAQVFFVFFPSGTE
 ACLLSVMAYDRYAAICHPLLYGQVMRNELCVRLVVISWGVASLNATIIVLLAVNLDFC
 GAQTIHHYTCELPALFPLSCSDISITVVVLLCSSLLHGLGTFIPIFFSYARIVSAILS
 ISSTTGRSKAFSTCSSHLAAVTLFFGSGFLCYLMPPSGSSLDLLSLQYSAVTP" (SEQ ID

NO:382).

BASE COUNT 98 a 203 c 142 g 200 t

ORIGIN

1 gttcgtagat ctctgcttct catccgtcac ggtaccgaaa ctgctgaagg acctctatc
 61 ggcgagaaa accatctcaa tagaaggctg cctggctcag gtctttttg tgtttttcc
 121 ttctggtact gaagcctgcc tgctctctgt catggcttat gaccgctatg ctgccatctg
 181 ccatccctg ctctacggcc aggtgatgag aaatgagttg tgtgtaaggc ttgtggtcat
 241 ctcatggggc gtggcctctc tcaacgcaac catcatcgtg ctcttggctg tcaacctgga
 301 cttctgtggg gtcacaacca tcaccacta cacctgtgag ctgctgccc ttteccctt
 361 gtctgttcc gatatctcca tcactgtcgt cgtctgctt tgctccagct tgcgtcatgg
 421 gctgggaacc ttatcccta tcttctctc ctatgccgc attgtctccg ccatcttgag
 481 catcagttcc accaccggga ggagcaaggc cttctccacc tgctctccc acctcgctgc
 541 agtgacctg ttcttgggt ctggctttt ttgctatctc atgcgcctt ctggttctt
 601 tctggacttg ctctgtcgt tgcagtacag cgcagtcacg ccc (SEQ ID NO:383).

OR230

LOCUS AF073966 643 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR15-71M21 olfactory receptor gene,
 partial cds.

ACCESSION AF073966

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 643)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 643)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

5 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..643

/organism="Mus musculus domesticus"

10 /sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR15-71M21"

mRNA <1..>643

/product="olfactory receptor"

15 CDS <1..>643

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="LVDIFFSSVTIPKMLANHLLGSKAISFGGCMAMQYFMISLGNTD

20 SYILAAAMAYDRAVAISRPLHYATIMSPQLCVLLVAGSWVIANANALPHTLLTARLSFC

GNKDVANFYCDITPLLQLSCSDIRFNVKMMYLGVGVSFVPLLCIIISYVRVFSTVLRV

PSTKGFLKALSTCGSHLTVVSLYYGTVMGMYFRPLTSYSLKHALITVMYTAVTP" (SEQ ID

NO:384).

BASE COUNT 133 a 171 c 148 g 191 t

25 ORIGIN

1 ccttgttgac atctcttctt cctctgtaac tattcccaag atgctggcca accatctcct

61 aggtagcaag gccatctcct tgggggatg tatggcacag atgtacttca tgatattcatt

121 gggaacaca gacagttata tactagctgc aatggcatat gaccgagctg tggctatcag

181 tcgcccgtt cattatgcaa caattatgag tccacaactt tgtgtcctgc tgggtgctgg

30 241 gtctctgggtg attgcaaatg ctaatgcact gcccacacc ctactcacag ctgattgtc

301 ctctgtggc aataaggatg tggccaactt ctactgtgac attacacctt tgcctcagct

361 gtctgtgtt gacatccgct tcaatgtgaa gatgatgtac cttgggggtgg gggtcttctc

421 tgtgccactg ctgtgcatca tcatctccta tgtccgggtc tttccacag tcttgcgggt

481 tccatctacc aagggtcttc tgaaggcctt gtccacctgt ggctctcacc tgacagtggg

35 541 gtctgttat tatgggacag tcatgggcat gtatttccgg ccctgacca gttacagtct

601 gaagcatgca ttgataactg tgatgtacac ggcagtgacc cca (SEQ ID NO:385).

OR231

40 LOCUS AF073967 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR15-71M24 olfactory receptor gene,
partial cds.

ACCESSION AF073967

KEYWORDS .

45 SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

50 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 5 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers
 source 1..649
 10 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR15-71M24"
 mRNA <1..>649
 15 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 20 /translation="LVDICFTTVIVPQMLVNLLTQRKTILFAQCLTQMYFFVAFGITD
 SFLLAAMAIDRYVAICNPLHYNTVMSPRRCRLLVASWAVSHLHSLHTILMGRLSFC
 GPNVIHHFFCDVQPLLTLSCSDTSINELLAFTEGSVVIMSPFILLLSLISIFTRTVLR
 VPSGEGRYKVFSTCGSHLTVVALFYGTIISVYIRPSSTYSVTKDRVVTVIYTVVTP" (SEQ ID

NO:386).
 25 BASE COUNT 134 a 180 c 128 g 207 t
 ORIGIN
 1 cctggtggac atctgcttta ccactgtcat cgtgccacag atgtagtga acttgctgac
 61 acagagaaag acaatcctct ttgcccagtg cctcactcaa atgtattct ttgtggcttt
 121 tggattaca gacagtttcc tttggctgc gatggccatt gaccgctatg ttgctatttg
 30 181 caatccgctt cattacaaca cagtcagtag tcccaggcgc tgcgcttgc tgggtgtggc
 241 atcctgggca gtgtcccatc ttaactccct caccacaca attctcatgg gtcgcctctc
 301 tttctgtgga cccaatgtca ttcatacact cttttgtgat gtccagccac tgctgacact
 361 ctctgtctct gacacctcta tcaatgagct ctggccctc acagagggct ctgttgtaat
 421 catgagccct ttatcttat tgtgtctct tatactata ttactcggga ctgttctgag
 35 481 ggtcccttca ggggaaggaa ggtacaaagt ttctctacc tgtgggtctc acctcacagt
 541 ttagcactg ttctatggaa ccataatc agtgtacatt cgccctcat ccacctactc
 601 agtgacaaag gaccgagttg tcaactgtcat ctatacagta gttacccca (SEQ ID NO:387).

OR232

40 LOCUS AF073968 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR18M olfactory receptor gene,
 partial cds.
 ACCESSION AF073968
 45 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 50 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are

potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES	Location/Qualifiers
source	1..649 /organism="Mus musculus domesticus" /sub_species="domesticus" /db_xref="taxon:10092" /clone="OR18M"
mRNA	<1..>649 /product="olfactory receptor"
CDS	<1..>649 /note="region between transmembrane domains TM2 and TM7." /codon_start=2 /product="olfactory receptor" /translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACL TQMYFFSVFGSLE IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCVWFVIFVYAMFHTLLLARLSFC KNNVIPHFCDISALLKLACSDVYINELMILILGGFLLVISLLLIIVSYVQIVSSILR ISSTRAIHKL FSTCGSHLSVVSIFYGTIIGLYLCP SANNSTEKETAMSLMYTVVTP" (SEQ ID

NO:388).
BASE COUNT 136 a 155 c 121 g 237 t
ORIGIN
1 ctctctgat ctctgcttt cctctgtcac aatgcccaag ttgtgcaga acatgcagat
61 ccaggacaca cccatactct atgtggcttg tctgacacaa atgtactttt tcagtgttt
121 tgggaagtctg gagataattcc ttctgtagt cctggcctat gaccgctatg tggccatctg
181 ttaccacctt caatatccca gcatcatgag ccccaatctc tgtgtgtgtg tggtggtgtt
241 ctgtgggga tttattgtgt tttatgccat gttcacaca ctactctgg ctagattgtc
301 atttgttaag aacaatgtga tcccacactt ttctgtgac atatctgcc tcttgaagtt
361 ggcgatctct gatgtttata ttaatgaatt aatgatactt atctgggag ggtttctct
421 tgtcatctca ctcttactca tcattgtatc ctatgtacaa atgtctctc caattttaag
481 gatttcttct actcggggcta tccataagct ctctccacc tgtggctcac acctgtctgt
541 ggtctcactg tcttatggga caattattgg tctgtactta tgtccatcag ctaataactc
601 tactgaaaag gagactgcc a tctccctgat gtacacagt gtgactccc (SEQ ID NO:389).

OR233

LOCUS AF073969 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR1M olfactory receptor gene, partial
cds.
ACCESSION AF073969
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 5 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 10 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 15 /clone="OR1M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 20 /codon_start=2
 /product="olfactory receptor"
 /translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
 SLLVAMAYDRYVAICFPLHYTSIMSPKLCGCLMLLLWMLTTSHAMMHTLLAARLSFC
 ENNVILNFFCDLFLVLLKLACSDTYVNELMIFIMSSLLVIPFLIVMSYARIIASILK
 25 VPSIQGIYKVFSTCGSHLSVTLFYGTIIGLYLCPSGNNSTVKGTVMAMMYTVVTP" (SEQ ID
 NO:390).
 BASE COUNT 142 a 161 c 123 g 223 t
 ORIGIN
 1 ctctctgat ctctgctttt cctctgtcac aatgcccaaa ttgctgcaga atatacagag
 30 61 ccaggaccca tccatccct atgcaggctg cctggcacia acatacttct ttatggttt
 121 tggagatatg gagagcttcc ttctgtggc catggcctat gaccgctatg tggccatctg
 181 cttccctctg cattacacca gcatcatgag tcccaactc tgtggttgc taatgctgct
 241 attgtggatg ctaacaacat cccatgccaat gatgcatact ctcttgcag caagattgtc
 301 ttttgtgag aacaatgtga tctcaattt ttctgtgac ctattgttc tctaaaagct
 35 361 ggcttgcga gacacttatg ttaatgagt gatgatatt ataatgagt cctctctcat
 421 tgttatcca ttttctca ttgtcatgic ttatgcaagg atcattgcct ccattctaa
 481 ggttccatct attcaaggga tctacaagg ctctccacc tgtggtccc atctgtctgt
 541 ggtgaccttg tttatggga caattattgg tctctacta tgtccatcag gtaataattc
 601 cacagtaaag gggactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:391).
 40

OR234

LOCUS AF073970 649 bp DNA ROD 12-JUL-1999
 45 DEFINITION Mus musculus domesticus clone OR21M olfactory receptor gene,
 partial cds.
 ACCESSION AF073970
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 50 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

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FEATURES             Location/Qualifiers
     source            1..649
                        /organism="Mus musculus domesticus"
                        /sub_species="domesticus"
                        /db_xref="taxon:10092"
                        /clone="OR21M"
     mRNA              <1..>649
                        /product="olfactory receptor"
     CDS               <1..>649
                        /note="region between transmembrane domains TM2 and TM7."
                        /codon_start=2
                        /product="olfactory receptor"
                        /translation="FADICFTSASIPKMLVNIQTKNKVITYEGCISQVFFFILFGVLD
NFLAVMAYDRYVAICHPLHYMVIMNRRLCGFLVLGSWVTTALNSLLQSSMALRLSFC
TDLKIPHFVCELNQLVLLACNDTFPNDMVMYFAAILGGGPLAGILYSYSKIVSSIRA
ISSSQGKYKASSTCASHLSVVSLFYSTLLGAYLSSFTQNSHSTARASVMYSVVTP" (SEQ ID
NO:392).
BASE COUNT    150 a   156 c   122 g   221 t
ORIGIN
    1 ctttcgagac atctgcttta cttctgctag catcccaaag atgctagtga atatacagac
   61 aaagaacaag gtgataacct atgaagggtg catttctcaa gtattctttt tcatactatt
  121 tggagtttta gataactttc ttctagctgt gatggcctat gaccgatatg tggcaatctg
  181 tcacctcttg cactatatgg tcatcatgaa ccgccgcctc tgtggatttt tagttttggg
  241 gtcttgggtc acaacagcat tgaattcctt gctgcagagt tcaatggcac tgcggctgtc
  301 cttttgtaca gacttgaaaa ttcccactt tgtttgtgag cttaatcaac tgggtactact
  361 tgctgtgaat gacacctttc ctaatgacat ggtgatgtac ttgcagcta tactgtggg
  421 tgggtgtcct cttgctggca tcctttactc ttattctaag atagtttctc ccatactgtc
  481 aatctcatca tcacagggga agtataaagc atcctccacc tgtgcatccc acctctcagt
  541 tgtttcatca ttctattcta cactctggg tgcgtatctt agttcttctt ttacacaaaa
  601 ctcacactca actgcacgag catctgttat gtacagtgtg gtcaccccc (SEQ ID NO:393).

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OR235

LOCUS AF073971 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR22M olfactory receptor gene,
partial cds.
ACCESSION AF073971
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR22M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FSDLCFSSVTMPKLLQNMQSQDSSITYAGCLTQMYFFLLFGDLE

SFLLVAMAYDRYVAICFPLHYMSIMSPSLCVSLVLLSWVLTFHAMLHTLLMARLSFC

EDNVIPYFFCDMSALLKLSCSDTHVNELVIFVTGGLILVIPFVLILVSYARIVSSILK

VPSARGIRKAFSTCGSHLSVVSFLFYGTIIGLYLCPSADNSTVKETVMAMMYTVVTP" (SEQ ID

NO:394).

BASE COUNT 121 a 184 c 140 g 204 t

ORIGIN

1 cttctctgat ctctgtcttt cctctgtcac aatgcccaaa ttgctgcaga acatgcagag

61 ccaggactca tccatcacct atgcaggatg cctgacacaa atgtacttt tcttgctctt

121 tggagacctt gagagcttcc tccttggtgc catggcctat gaccgctatg tggccatctg

181 ctccccctt cattacatga gcatcatgag cccagcctc tgtgtgagtc tgggtctgct

241 gtctgggtg ctgaccactt tccatgcat gctgcatacc ctgctcatgg ccagattgtc

301 attctgtgag gacaatgtga tcccctactt ttctgtgac atgtctgctc tgctgaagct

361 gtctgctct gacactcacg ttaatgaatt ggtgatatt gtcacaggag gcctgaccc

421 tgtcatcca ttgtgtcga tccttggtgc ctatgcacga attgtgtcct ccatttcaa

481 ggtcccgctg gctcgaggca tccgtaaagc cttctccacc tgtgggtccc acctgtctgt

541 ggtgtcactg ttctatggga caatcattgg tctgtactta tgtccatcag ctgataactc

601 tactgtgaag gaaactgtca tggccatgat gtacacagtg gtgactccc (SEQ ID NO:395).

OR236

LOCUS AF073972 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR25M olfactory receptor gene, partial cds.

ACCESSION AF073972

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR25M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
 SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTLYAMLHTLLLTRL SFC
 KNNVIPHFFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSILK
 VPSTRGIHKVFSTCGSHLSVVSLFYGSVIVLYLCPSSNNSTVKDTVMSMMYT VVIP" (SEQ ID
 NO:396).

BASE COUNT 136 a 163 c 118 g 232 t

ORIGIN
 1 cttcactgac ctctgcttt ctactgtcac aatgcccaat ttctgcaaa acatgcagag
 61 ccaagtatca tcattccct atgcaggctg cctgcacaa atgtacttct tttgtttt
 121 cggatgatgt gagagtttac tcttgttgc catggcctat gaccgttatg tggccatctg
 181 ctccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tgggtctgct
 241 gtctgggca ctgacaacat tgtatgcat gttgcacact ttgctcttaa ctagggtgtc
 301 ttctgtaaa aacaatgtga tccccattt ttctgtgac ctttctgctc tctgaagct
 361 ggctgtctct gatattcaca ttaatgagtt aatgataatg ataattggag cactgttgtt
 421 tatactcca ttctactca tcatagtgtc ttatgcgcac attgtctctc ccattctcaa
 481 agtcccttca actcgaggca tccacaaggt ctctccact tgtgggtctc atctgtctgt
 541 ggtgtcactg ttctatgggt cagtcaattg tctgtactta tgtccatcat ctaataactc
 601 tactgtgaag gatactgtca tgctatgat gtacactgtg gtgattccc (SEQ ID NO:397).

OR237

LOCUS AF073973 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR27M olfactory receptor gene,
 partial cds.
 ACCESSION AF073973
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR27M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE

SLLLVMAYDRYVAICSPHLYTRIMSPNLCVSMVLLSWALTTLTYAMLHTLLTRL SFC

KNNVIPHFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIHVSIAHIVSSTLK

VPSTRGIHKVFSTCGSHLSVVSIFYGSVIVLYLCPSSNNSTVKDTVM SMMYTVVTP" (SEQ ID

NO:398).

BASE COUNT 136 a 165 c 117 g 231 t

ORIGIN

1 cttcactgac ctctgcttt ctactgtcac aatgccaat ttctgcaaa acatgcagag

61 ccaagtatca tccattccct atgcaggctg ccttgacaaa atgtacttct tttgtttt

121 tggatgatgt gagagttaac tcttggtgc catggcctat gaccgttatg tggccatctg

181 ctcccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tgggtgctgt

241 gtccctgggca ctgacaacat tgtatgcat gttgcacact ttgtcttaa ctagggtgtc

301 ttctgtaaa aacaatgtga tccccattt ttctgtgac cttctgtctc tctgaagct

361 ggctgtctct gatattcaca ttaatgagtt aatgataatg ataattggag cactgtgtgt

421 tatacttcca ttctactca tcatagtgtc ttatgcgcac attgtctct cactctcaa

481 agtccttca actcgaggca tccacaaggt ctctccact tgggtgtctc atctgtctgt

541 ggtgtcactg ttctatgggt cagtcattgt tctgtactta tgtccatcat ctaataactc

601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgactccc (SEQ ID NO:399).

OR238

LOCUS AF073974 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR28M olfactory receptor gene,
partial cds.

ACCESSION AF073974

KEYWORDS .

SOURCE western European house mouse.

1987-1988	1988-1989
1989-1990	1990-1991
1991-1992	1992-1993
1993-1994	1994-1995
1995-1996	1996-1997
1997-1998	1998-1999
1999-2000	2000-2001
2001-2002	2002-2003
2003-2004	2004-2005
2005-2006	2006-2007
2007-2008	2008-2009
2009-2010	2010-2011
2011-2012	2012-2013
2013-2014	2014-2015
2015-2016	2016-2017
2017-2018	2018-2019
2019-2020	2020-2021
2021-2022	2022-2023
2023-2024	2024-2025
2025-2026	2026-2027
2027-2028	2028-2029
2029-2030	2030-2031
2031-2032	2032-2033
2033-2034	2034-2035
2035-2036	2036-2037
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2051-2052	2052-2053
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2059-2060	2060-2061
2061-2062	2062-2063
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2089-2090	2090-2091
2091-2092	2092-2093
2093-2094	2094-2095
2095-2096	2096-2097
2097-2098	2098-2099
2099-2100	2100-2101
2101-2102	2102-2103
2103-2104	2104-2105
2105-2106	2106-2107
2107-2108	2108-2109
2109-2110	2110-2111
2111-2112	2112-2113
2113-2114	2114-2115
2115-2116	2116-2117
2117-2118	2118-2119
2119-2120	2120-2121
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2125-2126	2126-2127
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2159-2160	2160-2161
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2163-2164	2164-2165
2165-2166	2166-2167
2167-2168	2168-2169
2169-2170	2170-2171
2171-2172	2172-2173
2173-2174	2174-2175
2175-2176	2176-2177
2177-2178	2178-2179
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2183-2184	2184-2185
2185-2186	2186-2187
2187-2188	2188-2189
2189-2190	2190-2191
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2195-2196	2196-2197
2197-2198	2198-2199
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2201-2202	2202-2203
2203-2204	2204-2205
2205-2206	2206-2207
2207-2208	2208-2209
2209-2210	2210-2211
2211-2212	2212-2213
2213-2214	2214-2215
2215-2216	2216-2217
2217-2218	2218-2219
2219-2220	2220-2221
2221-2222	2222-2223
2223-2224	2224-2225
2225-2226	2226-2227
2227-2228	2228-2229
2229-2230	2230-2231
2231-2232	2232-2233
2233-2234	2234-2235

SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

5 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished

10 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 15 France

FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR29M"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDLCQSSVIMPKMLEKFVMVKSVISFAECMAQFYLFDFVFAVSE
 CHMLAVMAYDRYVAICNPLLYNVVTMSYKVCSSWMVVGVSGLICATGETVCLLRLLFC
 KADDINHYFCDLLPLLEQSCSNTFINEILGLSFSSFNTPALTLSSYIFIASILR
 IPSTEGRSKAFSTCSSHILAVAVFFGSLAFMYLQPSSVSSMDQGVSSVFYITIVVP" (SEQ ID
 NO:402).
 BASE COUNT 143 a 159 c 130 g 217 t
 ORIGIN
 35 1 ttctgtgac ctctgccagt ccagtgtcat catgcccaaa atctggaga aattgtcat
 61 ggtgaagagt gtcattctt tgcagaatg catggctcag tttacttat ttgatgttt
 121 tgctgttca gagtgcaca tgctggctgt catggcttat gatcgctatg ttgccatctg
 181 taacccttg ctatataatg ttaccatgtc ttacaaagtg ttttctgga tggtagtggg
 241 ggtgtatagt gtaggcctga ttgtgccac aggggaaaca gtctgcctgc ttagactgct
 40 301 attctgcaa gctgatgaca taaaccacta ctctgtgat ctttaccac tactggaaca
 361 atcctgttc aatacattha tcaatgaaat actaggactg tccttcagtt catttaatac
 421 tactgtcca gctctgacca tctcagttc ctacatctc atcatagcca gcatcctccg
 481 cattccttc actgaaggca ggtccaaagc cttcagcacc tgcagctccc acatcttggc
 541 tgttctgtc ttcttgggt ctttagcatt catgtacctt cagccatcat cagtcatctc
 45 601 catggaccaa gggaaagtgt cctctgtgtt ttataccatt gttgtgcc (SEQ ID NO:403).

OR240

LOCUS AF073976 649 bp DNA ROD 12-JUL-1999
 50 DEFINITION Mus musculus domesticus clone OR2M olfactory receptor gene, partial
 cds.
 ACCESSION AF073976

KEYWORDS

SOURCE western European house mouse.

ORGANISM *Mus musculus domesticus*

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; *Mus*.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR2M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE

SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMHLTLLTRLSTFC

ENNVIPIHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLVTVSYARISSILK

VPSTRGIHKVFSTCGSHLSVVSIFYGTIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID

NO:404).

BASE COUNT 126 a 177 c 123 g 223 t

ORIGIN

1 cttcactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
 61 ccaagtctct tcaatccct atgcaggctg cctgacacaa atgtacttct tttgtttt
 121 tggagatctt gagagcttc tcctgtggc catggcctat gaccgatatg tagccatctg
 181 ctccctctt cattacacca gcattatgag cccagggctc tgtgtgagtc ttgtgtgct
 241 gtctctggtg ctgacctgt cccattccat gtgcacact ttgtcttaa ctagggtgtc
 301 ttctgtgaa aacaatgtga tccccattt ttctgtgat ctgtctgctc tgcgaagct
 361 ggctgtctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggctgttgt
 421 tatactcca ttctactcg tcacagtgtc ttatgcacgc atcatctct ccaattcaca
 481 ggtccctca actcgaggca tccacaaggt ctctccact tgtggtctc acctgtctgt
 541 ggtgtcactg ttctatggga caattattgg cctctactta tgcctatctg ctaataactc
 601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:405).

OR241

LOCUS AF073977 650 bp DNA ROD 12-JUL-1999

DEFINITION *Mus musculus domesticus* clone OR3M olfactory receptor gene, partial cds.

ACCESSION AF073977

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 650)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 650)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..650

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR3M"

mRNA <1..>650

/product="olfactory receptor"

CDS <1..>650

/note="region between transmembrane domains TM2 and TM7."

/codon_start=3

/product="olfactory receptor"

/translation="FSDLCPFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE

IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCWVFVIFYAMFHTLLARLSFC

KNNVIPHFFCDISALLKLACSDVYINELMILILGGFLLVTSLLLIIVSYVQIVSSILR

ISSTRAIHKLFSTCGSHLSVVSIFYGAIIGLYLCPSANNSTKETAMSLMYTVVTP" (SEQ ID

NO:406).

BASE COUNT 135 a 157 c 122 g 236 t

ORIGIN

1 ccttctctga tctctgcttt tctctgtca caatgcccaa gttgctgcag aacatgcaga

61 tccaggacac acccatatcc tatgtggctt gtctgacaca aatgtacttt ttcagtgttt

121 ttggaagtct ggagatattc ctcttcttag tctctggccta tgaccgctat gtggccatct

181 gtttaccct tcaatattcc agcatcatga gcccgaatct ctgtgtgtgt gtggtggtgt

241 tctgctgggt atttattgtg ttttatgcca tgttcacac actactcttg gctagattgt

301 cattttgtaa gaacaatgtg atccacact tttctgtga catatctgcc ctctgaagt

361 tggcatgctc tgatgttat attaagaat taatgatact tatctggga gggttcttc

421 ttgtcacctc actcttactc atcattgtat cctatgtaca aattgtctcc tcaattttaa

481 ggatttcttc tactcgggct atccataagc tctctccac ctgtggctca cactgtctg

541 tggctcact gttctatggg gcaattattg gtctgtactt atgtccatca gctaataact

601 ctactgaaaa ggagactgcc atgtccctga tgacacagt ggtgactccc (SEQ ID NO:407).

OR242

LOCUS AF073978 648 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR4M olfactory receptor gene, partial

cds.

ACCESSION AF073978

KEYWORDS .

SOURCE western European house mouse.

5 ORGANISM *Mus musculus domesticus*
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 648)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

10 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished

REFERENCE 2 (bases 1 to 648)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

15 TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

20 source 1..648
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
/clone="OR4M"

25 mRNA <1..>648
/product="olfactory receptor"

CDS <1..>648
/note="region between transmembrane domains TM2 and TM7."
/codon_start=2

30 /product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNMQIQDTPISYVACLTQMYFFSVFGSLE
IFLLVVLAYDRYVAICLPLQYSSIMSPNLCVCVVVFCWVFIVFYAMFHTLLARLSFC
KNNVIPHFFCDISALLKLACSDVYINELMILILGGFLLVISLLLIIVSYVQIVSSILR
ISSTRAIHKLFSTCGSHLSVVSFLFYGTIIGLYLCPSANNSTEKETAMSLMYTVVTP" (SEQ ID

35 NO:408).

BASE COUNT 135 a 154 c 122 g 237 t

ORIGIN

1 cttctctgat cttctgtttt cctctgtcac aatgcccaag ttgctgcaga acatgcagat
61 ccaggacaca cccatatcct atgtggcttg tctgacacaa atgtactttt tcagtgtttt
40 121 tgggagctcg gagatatcc ttctgtagt cctggcctat gaccgctatg tggccatctg
181 ttaccctt caatattcca gcatcatgag cccaatctc tgtgtgtgtg tgggtgtgtt
241 ctgctgggta ttattgtgt ttatgcca gtttcacaca ctactcttgg ctagattgtc
301 atttgtaag aacaatgtga tcccacactt ttctgtgac atatctgccc ttctgaagtt
361 ggcagctct gatgtttata ttaatgaatt aatgatactt atctgggag ggtttctct
45 421 tgtcatctca ctcttactca tcattgtatc ctatgtacaa attgtctcct caattttaag
481 gattttctt actcgggcta tcataagct ctctccacc tgtggctcac acctgtctgt
541 ggtctcactg ttctatggga caattattgg tctgtactta tgtccatcag ctaataactc
601 tactgaaaag gagactgcc a tgcctgat gtacacagtg gtgactcc (SEQ ID NO:409).

OR243

LOCUS AF073979 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR5M olfactory receptor gene, partial
 5 cds.

ACCESSION AF073979

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 15 potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 20 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR5M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FSDLCFSSVTMPKLLQNMQSQDPSIPYASCLTQMYFFMAFGNME

IYLLVVMAYDRYVAICFPLHYTSIMSPKLCVSLVVLVSWVFTILYSMLHTLLARLSFC

EDNVIPHFFCDISALLKLACSDISINELMIFIVGGLDTVIPFLIVVSYVQIVCSILK

FSSTRGIHKVFSTCGSHLSVSVSLFYGTIIGVYICPSANNSTVKETVMSLMYTVVTP" (SEQ ID

NO:410).

BASE COUNT 135 a 171 c 124 g 219 t

ORIGIN

1 cttctctgat cttctgtttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag
 61 ccaggaccaca tccatccct atgccagctg tctgacacaa atgtactttt tcatggcttt
 121 tgggaacatg gaaatttacc ttcttggtgt catggcctat gaccgctatg tggccatctg
 181 cttccctctt cattacacca gcatcatgag ccctaagctc tgtgtgtctc tgggtgttct
 241 cttctgggta ttaccattc tgtattccat gtacacacc ctactcttgg caagattgtc
 301 attctgtgag gacaatgtga tcccccaact ttctgtgac atatctgccc tgcacaaagt
 361 ggctgtctct gacatttcta ttaatgaact aatgatatt atcgtgggag ggcttgatac
 421 tgtaatccca tttttactca ttgtgtttc ctatgtacaa attgtctgct ccattctaaa
 481 gttctcatct acacggggca tacacaagggt cttctccacc tgttgctccc acctgtctgt
 541 ggtctcactg ttctatggga caattattgg tgtctacata tgcccatcag ctaataactc
 601 tactgtgaag gagactgtca tgtccctgat gtacacagtg gtgacgccc (SEQ ID NO:411).

OR244

LOCUS AF073980 649 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR6M olfactory receptor gene, partial cds.

ACCESSION AF073980

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5, France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR6M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE

SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMHLTLLTRLSTFC

ENNVIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLVTPYARISSILK

VPSTRGIHKVFSTCGSHLSVVSFLFYGTIIIGLYLCPSANNSTLKDTVMSLMYTVVTP" (SEQ ID

NO:412).

BASE COUNT 126 a 178 c 123 g 222 t

ORIGIN

1 cttcactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag

61 ccaagtccct tcaatcccct atgcaggctg cctgacacaa atgtacttct tttgtttt

121 tggagatctt gagagcttcc tccttgtggc catggcctat gaccgatatg tagccatctg

181 ctccctctt cattacacca gcattatgag cccagggctc tgtgtgagtc ttgtctgct

241 gtcttggttg ctgacctgt cccattccat gctgcacact ttgctcttaa ctagggtgtc

301 ttctgtgaa aacaatgtga tccccattt ttctgtgat ctgtctgctc tgcgaagct

361 ggctgtctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttgtgt

421 tatactcca ttctactcg tcacagtgcc ttatgcacgc atcatctct ccatctcaa

481 ggcccttca actcgaggca tccacaaggt ctctccact tgtggttctc acctgtctgt

541 ggtgtcactg ttctatggga caattatgg cctctactta tgcctatctg ctaataactc

601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:413).

OR245

5 LOCUS AF073981 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR7M olfactory receptor gene, partial
cds.
ACCESSION AF073981
KEYWORDS .
10 SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
REFERENCE 1 (bases 1 to 649)
15 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
REFERENCE 2 (bases 1 to 649)
20 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France
25 FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
/db_xref="taxon:10092"
30 /clone="OR7M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
/note="region between transmembrane domains TM2 and TM7."
35 /codon_start=2
/product="olfactory receptor"
/translation="FTDLCFSTVTMPNFLQNMQSQVSSIPYAGCLAQMYFFLFFGDVE
SLLLVAMAYDRYVAICFPLHYTRIMSPNLCVSMVLLSWALTTYAMLHTLLLTRLSFC
KNNVIPHFCDLSALLKLACSDIHINELMIMIIGALVVILPFLLIIVSYAHIVSSILK
40 VPSTRGIHKVFSTCGSHLSAVSLFYGSVIVLYLCPSSNNSTVKDTVMSMMYTVVTP" (SEQ ID
NO:414).
BASE COUNT 136 a 165 c 117 g 231 t
ORIGIN
1 ctctactgac ctctgcttt ctactgtcac aatgcccaat ttctgcaaa acatgcagag
45 61 ccaagatca tcattccct atgcaggctg ccttgacaaa atgtacttct tttgtttt
121 tggatgatgt gagagcttac tcttgttgc catggcctat gaccgttatg tggcatctg
181 ctccctctt cattatacca gaatcatgag cccaaacctc tgtgtgagta tggctgctg
241 gtctctggca ctgacaacat tgtatgcat gttgcacact ttgctcttaa ctagggtgtc
301 ttctgtaaa aacaatgtga tccccattt ttctgtgac cttctgctc tctgaagct
50 361 ggcctgctct gatattcaca ttaatgagt aatgataatg ataattggag cactgttgt
421 tatacttca ttctactca tcatagtgtc ttatgcgcac attgtctct ccattctcaa
481 agtcccttca actcgaggca tccacaaggt ctctccact tgtggttctc atctgtctgc

541 ggtgtcactg ttctatgggt cagtcattgt tctgtactta tgtccatcat ctaataactc
601 tactgtgaag gatactgtca tgtctatgat gtacactgtg gtgactccc (SEQ ID NO:415).

OR246

5 LOCUS AF073982 649 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus domesticus clone OR8M olfactory receptor gene, partial
cds.
10 ACCESSION AF073982
KEYWORDS .
SOURCE western European house mouse.
ORGANISM Mus musculus domesticus
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
15 REFERENCE 1 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional
JOURNAL Unpublished
20 REFERENCE 2 (bases 1 to 649)
AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
TITLE Direct Submission
JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
25 France
FEATURES Location/Qualifiers
source 1..649
/organism="Mus musculus domesticus"
/sub_species="domesticus"
30 /db_xref="taxon:10092"
/clone="OR8M"
mRNA <1..>649
/product="olfactory receptor"
CDS <1..>649
35 /note="region between transmembrane domains TM2 and TM7."
/codon_start=2
/product="olfactory receptor"
/translation="FSDLCFSSVTMPKLLQNIQSQDPSIPYAGCLAQTYFFMVFGDME
SFLLVAMAYDRYVAICFPLHYTSIMSPKLCGCLMLLLWMLTTSHAMMHTLLAARLSFC
40 ENNVILNFFCDLFLVLLKLACSDTYVNELMIFIMSSLLVIPFFLIVMSYARIIASILK
VPSIQGIYKVFSTCGSHLSVVTLYFYGTIIGLYLCPSGNNSTVKGTVMAMMYTAVTP" (SEQ ID
NO:416).
BASE COUNT 143 a 162 c 123 g 221 t
ORIGIN
45 1 ctctctgat ctctgctttt cctctgtcac aatgccccaa ttgctgcaga atatacagag
61 ccaggaccca tccatccctc atgcaggctg cctggcacia acatacttct ttatggtttt
121 tggagatatg gagagctcc ttctgtggc catggcctat gaccgctatg tggccatctg
181 ctccctctg cattacacca gcatcatgag tcccaaactc tgggtgtgc taatgctgct
241 attgtgatg ctaacaacat cccatgccat gatgcatact ctcttgcag caagattgtc
50 301 ttttgtgag aacaatgga tcccaattt tttctgtgac ctattgttac tcctaaagct
361 ggcttgctca gacacttatg ttaatgagtt gatgatattt ataagagtt cctcctcat
421 tgttattcca ttttctca ttgtcatgct ttatgcaagg atcattgcct ccattcttaa

481 ggttccatct attcaaggga tctacaaggt cttctccacc tgtggtccc atctgtctgt
 541 ggtgaccttg ttttatggga caattattgg tctctactta tgtccatcag gtaataattc
 601 cacagtaaag gggactgtca tggccatgat gtacacagcg gtgactccc (SEQ ID NO:417).

5 OR247

LOCUS AF073983 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR912-47M4 olfactory receptor gene,
 partial cds.

10 ACCESSION AF073983

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

15 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

20 JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

25 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

30 /sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR912-47M4"

mRNA <1..>649

/product="olfactory receptor"

35 CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFAELD

40 NFL LAVMAYDRYVAICHPLYYTIVNQHLCLMVLLSWVVSILHAF LQSSIVLQLTFC

GDVKIPHFFCELNQLSQLTCSDFSSQLIMNLVPVLLAVISFSSILYSYFKIVSSICS

ISSVQ GK YKAFSTCVSHLSIVSLFYSTGLGVYVSSVVIQSSHSAARASVMYTVVTP" (SEQ ID

NO:418).

BASE COUNT 148 a 157 c 118 g 226 t

45 ORIGIN

1 ctttgtggac atctgtttta cctccaccac tgtcccaaag atgctggtaa atatacagac

61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt

121 tgcagaattg gacaacttct tcttggtctg gatgcctat gaccgatatg tggctatctg

181 tcaccatta tattacacag tcattgttaa ccaacatctc tgtatactga tggttctgct

50 241 gtctggggtt gtagcatcc tacatgcctt cttacagagc tcaattgtgc tacagttgac

301 cttttgtgga gatgtaaaaa ttcccactt cttctgtgag ctttaaccage tgtctcaact

361 cacatgttca gagagctttt caagccaact cataatgaat cttgtacctg ttctattggc

421 agtcatttcc ttacagtagta tcctttactc ttatttcaag atagtgtcct ccatatgttc
 481 tatctcctca gtccaaggga agtacaaggc attttctaca tgtgtctctc acctttccat
 541 tgtctcctta tttatagta caggccttgg agtgtatgtc agttctgttg tgatccaaag
 601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcaccccg (SEQ ID NO:419).

5

OR248

LOCUS AF073984 646 bp DNA ROD 12-JUL-1999

DEFINITION Mus musculus domesticus clone OR912-47M6 olfactory receptor gene,
 partial cds.

ACCESSION AF073984

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 646)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 646)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France

FEATURES Location/Qualifiers

source 1..646

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR912-47M6"

mRNA <1..>646

/product="olfactory receptor"

CDS <1..>646

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="SVDVCFSSSTTVPKVLAIHILRNQAISFSGCLTQLYFLCVFADMD

NFLAVMAYDRFVAICHPLHYTTKMTHQLCAFLVVGSWMVASLNALLHTLLVAQLYFC

GDNVIPHFCEVTPLKLSKSDTHLNEMLAVAGLIMLAPFVCILLSYILIACAILK

ISSTGRWKAFSTCGSHLAVVCLFYGTIISLYFNPSSSHSAGRDMAAAMMYTVVTP" (SEQ ID

NO:420).

BASE COUNT 128 a 178 c 133 g 207 t

ORIGIN

1 ctctgtggat gtagcttct cctccaccac tgtccctaag gtactggcca ttacatact
 61 aagaaatcaa gccatttctg tctctgggtg cctcacacag ctgtatttc tctgtgtgtt
 121 tgctgacatg gacaatttcc tgctggctgt gatggcctat gaccgatttg tggccatatg
 181 ccaccttcta cactacacaa caaagatgac ccatcagctt tgtgccttc ttgttgttgg
 241 gtctggatg gtagccagtc tgaatgctct gttgcacaca ctgctcgtgg ctcaactcta
 301 cttctgtggg gacaatgtga tccccactt cttctgtgaa gtgactcccc tgctgaaact

361 ctcttgetca gacacacatc tcaatgagtt gatgattctt gctgttcag ggctgataat
 421 gttagctcca ttgtttgca tcctctgtc ttatatacctt attgcttggt ccatcctgaa
 481 aatctcatcc acaggaagat ggaaagcctt ctctacctgt ggctcacact tggctgttgt
 541 gtgcctcttc tatggcacta tcataccct gtatttcaac ccctcatctt ctactcagc
 5 601 tgggaggggac atggcagctg ccatgatgta cacagtgggtg accccc (SEQ ID NO:421).

OR249

LOCUS AF073985 650 bp DNA ROD 12-JUL-1999
 10 DEFINITION Mus musculus domesticus clone OR912-47M7 olfactory receptor gene,
 partial cds.
 ACCESSION AF073985
 KEYWORDS .
 SOURCE western European house mouse.
 15 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 650)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 20 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 650)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 25 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 30 source 1..650
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR912-47M7"
 35 mRNA <1..>650
 /product="olfactory receptor"
 CDS <1..>650
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 40 /product="olfactory receptor"
 /translation="FVDICFTSTTVPKMLVNIQTQSKAITYADCISQMSVFLVFGELD
 NFLAVMAYDRYVAICHPLYTIFVNQHLCLMVLLSWVVSILHAFQLQSSIVLQLTFC
 GDVRIPHFFCELNQLSQLTCSDSLSSHLIMHLVPVLLGAISFSSILYSYFKIVSSICS
 ISSVQKGKYKAFSTCVSHLSIVSLFYSTGLGVYVSSAVVQSSHSAARASVMYTVVTH" (SEQ ID
 45 NO:422).
 BASE COUNT 148 a 159 c 121 g 222 t
 ORIGIN
 1 ctttgtggac atctgtttca cctccaccac tgcctcaaag atgctggtaa atatacagac
 61 tcaaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt
 50 121 tggagaactg gacaacttc tcctggctgt gatggcctat gaccgatatg tggctatctg
 181 tcaccctatg tattacacat tcattgttaa ccaacatctc tgtatactga tggttctgct
 241 gtctctgggt gttagcatcc tacatgcctt cttacagagc tcaattgtac tacagtgac

301 ctttgtgga gatgaagaa ttcccactt cttctgtgag ctaaccagc tgttcaact
 361 cacatgttca gacagcttat caagccacct cataatgcat cttgtacctg ttctattggg
 421 agccatttcc ttcagtagta tcctttactc ttatttcaag atagtgtcct ccatatgttc
 481 tatctcctca gttcaaggga agtacaaggc atttctaca tgtgtctctc acctttccat
 541 tgtatcctta tttatagta caggccttgg agtgtatgtc agttctgtcg tggccaag
 601 ctctcactct gctgcaagag cctctgtgat gtatactgtg gtcacacacg (SEQ ID NO:423).

OR250

LOCUS AF073986 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR912-47M8 olfactory receptor gene,
 partial cds.
 ACCESSION AF073986
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR912-47M8"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FVDICFTSTTVPKVLVNIQTQSKAITYADCISQMSVFLVFAELD
 NFLAVMAYDRYVAICHPLYTIFVNQHLCLMVLLSWVVSILHAFLQSSIVLQLTFC
 GDVKIPHFFCELNQLSQLTCLDSFSSHLIMNLVPVLLAVISFSSILYSYFKIVSSICS
 ISSVQGKYKAFSTCVSHLSIVFLFYSTGLGVYVSSAVVQSSHAARASVMYTVVTP" (SEQ ID
 NO:424).
 BASE COUNT 144 a 159 c 120 g 226 t
 ORIGIN
 1 ctttgtggac atctgtttca cctccaccac tgtcccaaag gtgctggtaa atatacagac
 61 tcaagcaag gccattacat atgcagactg tattagccag atgtctgtct tcttggtttt
 121 tgcagaattg gacaacttcc tcttggtgtg gatggcctat gaccgatatg tggctatctg
 181 tcaccattg tattacacat tcattgttaa ccaacatctc tgtatactga tggttctgct

241 gtctgggtt gtagcatcc tacatgcctt cttacagagc tcaattgtgc tacagttgac
 301 cttttgtga gatgtaaaaa ttcccactt ctctgcgag cttaccagc tgtctcaact
 361 cacatgttta gacagctttt caagccacct cataatgaat ctgtacctg ttctattggc
 421 agtcatttcc ttacagtaga tcctttactc ttatttcaag atagtgtcct ccatatgttc
 481 tatctctca gttcaaggga agtacaaggc atttctaca tegtctctc accttccat
 541 tgtctctta tttatagta caggccttgg agtgtatgtc agttctgctg tggccaag
 601 ctctcactt gctgcaagag cctctgtgat gtatactgtg gtcaccccg (SEQ ID NO:425).

OR251

LOCUS AF073987 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR912-47M9 olfactory receptor gene,
 partial cds.
 ACCESSION AF073987
 KEYWORDS .
 SOURCE western European house mouse.
 ORGANISM Mus musculus domesticus
 Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
 Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.
 REFERENCE 1 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional
 JOURNAL Unpublished
 REFERENCE 2 (bases 1 to 649)
 AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.
 TITLE Direct Submission
 JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS
 UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
 France
 FEATURES Location/Qualifiers
 source 1..649
 /organism="Mus musculus domesticus"
 /sub_species="domesticus"
 /db_xref="taxon:10092"
 /clone="OR912-47M9"
 mRNA <1..>649
 /product="olfactory receptor"
 CDS <1..>649
 /note="region between transmembrane domains TM2 and TM7."
 /codon_start=2
 /product="olfactory receptor"
 /translation="FADLCFSTTTVPQVLVHFLVKRKTISFAGCSTQIVVLLLVGCTE
 CALLAVMSYDRYVAVCKPLHYSTIMTHWLCVQLAAGSWASGALVSLVDTTFTLRPLPYR
 GNNVINHFFCEPPALLKLASADTYSTEMAIFAMGVVILLAPVSLILTSYWNIISTVIQ
 MQSGEGRCLKVFSTCGSHLIVVVLFGSAIFAYMRPNSKIMNEKDKMISVFYSAVTP" (SEQ ID
 NO:426).
 BASE COUNT 141 a 175 c 146 g 187 t
 ORIGIN
 1 ctttcagat ctctgcttt ctactaccac agtgccccag gtgctgtcc acttcctggt
 61 gaagaggaag accattctt ttgctggatg ttctacacag atagtgggtg tgcttctggt
 121 cggatgcaca gagtgtgcac tgctggcagt gatgtcctat gaccgatatg tggctgtctg

181 caaacctctg cactactcca ccatcatgac acactggcta tgtgttcagc tggctgcagg
 241 gtctggggcc agtgggtcac ttgtgtccct ggtggatacc acattcacat tacgtcttcc
 301 ttatcgagga aacaatgtca ttaaccactt ttctgtgaa cctcctgccc tctgaagct
 361 ggcacgggca gatacatca gcacagagat ggcgatcttt gcaatgggtg tggtaatcct
 421 cctagcacct gtctccctca tctcacctc ctactggaac atcatctcca ctgtaatcca
 481 gatgcagtct ggggaaggaa ggctcaaggt ctctccacc tgtggctccc acctcattgt
 541 tgtgtttctc ttctacggct cagcaatatt tgcctacatg aggcccaact ctaagataat
 601 gaatgaaaag gataaaatga ttctgggtgt ctattcagca gtgaccccg (SEQ ID NO:427).

OR252

LOCUS AF073988 649 bp DNA ROD 12-JUL-1999
 DEFINITION Mus musculus domesticus clone OR9M olfactory receptor gene, partial
 cds.

ACCESSION AF073988

KEYWORDS .

SOURCE western European house mouse.

ORGANISM Mus musculus domesticus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;

Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
 potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 649)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,

France

FEATURES Location/Qualifiers

source 1..649

/organism="Mus musculus domesticus"

/sub_species="domesticus"

/db_xref="taxon:10092"

/clone="OR9M"

mRNA <1..>649

/product="olfactory receptor"

CDS <1..>649

/note="region between transmembrane domains TM2 and TM7."

/codon_start=2

/product="olfactory receptor"

/translation="FTDLCFSSVTMPKLLQNMQSQVPSIPYAGCLTQMYFFLFFGDLE

SFLLVAMAYDRYVAICFPLHYTSIMSPRLCVSLVLLSWLLTMSHSMMLHTLLLTRL SFC

ENNVIPHFFCDLSALLKLACSDIHINELVILIIGGLVVILPFLLVTVSYARISSILK

VPSTRGIHKVFSTCGSHLSVVSIFYGTIIIGLYLCP SANNSTLKDTVMSLMYTVVTP" (SEQ ID

NO:428).

BASE COUNT 126 a 177 c 123 g 223 t

ORIGIN

1 ctctactgac ctctgctttt cctctgtcac aatgcccaag ttgctgcaga acatgcagag

61 ccaagtctct tcaatcccct atgcaggctg cctgacacaa atgtacttct tttgtttt

09747155.123100

121 tggagatctt gagagcttcc tccttggtggc catggcctat gaccgatatg tagccatctg
181 cttccctctt cattacacca gcattatgag ccccaggctc tgtgtgagtc ttgtgctgct
241 gtcctggttg ctgacctgt cccattccat gctgcacact ttgctcttaa ctagggtgtc
301 ttctgtgaa aacaatgtga tccccattt ttctgtgat ctgtctgctc tgctgaagct
361 ggctgctct gatattcaca ttaatgaatt ggtgatattg atcataggag ggcttgtgt
421 tatactcca ttctactcg tcacagtgc ttatgcacgc atcatctct ccattctcaa
481 ggtccctca actcgaggca tccacaaggt cttctccact tgtggtctc acctgtctgt
541 ggtgtcactg ttctatggga caattattgg cctctactta tgtccatctg ctaataactc
601 tactctaaag gacactgtca tgtctctgat gtacactgtg gtaactccc (SEQ ID NO:429).

OR253

LOCUS AF073989 1865 bp DNA ROD 12-JUL-1999
DEFINITION Mus musculus clone OR1-72M13 olfactory receptor gene, complete cds.
ACCESSION AF073989
KEYWORDS .

SOURCE house mouse.

ORGANISM Mus musculus

Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Mammalia;
Eutheria; Rodentia; Sciurognathi; Muridae; Murinae; Mus.

REFERENCE 1 (bases 1 to 1865)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Mouse olfactory receptor genes orthologous to human pseudogenes are
potentially functional

JOURNAL Unpublished

REFERENCE 2 (bases 1 to 1865)

AUTHORS Giorgi,D.G., Delettre,C. and Rouquier,S.R.P.

TITLE Direct Submission

JOURNAL Submitted (23-JUN-1998) Institut de Genetique Humaine (IGH), CNRS

UPR 1142, 141 rue de la Cardonille, Montpellier 34396 Cedex 5,
France

FEATURES Location/Qualifiers

source 1..1865

/organism="Mus musculus"

/db_xref="taxon:10090"

/clone="OR1-72M13"

/cell_line="NIH3T3"

mRNA 547..1482

/product="olfactory receptor"

CDS 547..1482

/note="orthologous to human gene OR1-72"

/codon_start=1

/product="olfactory receptor"

/translation="MKPENQTKYFRIFASGVFQYPEHQPMFLFGLFLLMFVVAVLGNLL

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FFMLFGGMDTLLLTVMAYDRFVAICHPLHYSVIMNPQLSGLLVLVSWFISFSYSLIQS

LLMLRLSFCTNQIHKHFYCEYAKALTIACSDTLINHILLYIVIWVLGFIPFSGILYSY

YKIFSSILRIPSTDGKYKAFSTCGSHLSVVSFLFYGTGLSVYLSSDATSSSGKGVVASV

MYTVVTPMLNPFYSLRNKDIKKALKTLGRILLK" (SEQ ID NO:430).

BASE COUNT 568 a 355 c 321 g 621 t

ORIGIN

1 ctgcagagtg agttctagga cagccaggac tacacagaga aacctgaat caaaataaaa

61 taaaataaaa tacaatagaa taaaataaaa taaacaaaaa agaaaaaaga agataaagat
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 5 301 tgactaaca ctccagagg ttatctggtc ttcattgtgt taaaatttg tagagttagc
 361 agttctaagt agagataagg tagagaaact aataatgatg agaaaatgca ggattcctaa
 421 tttttattgt aataaaagct ttatgtacag ttattccaac acataaaagg acagagacct
 481 tagagactgt agtgtatgt cctcaatctt tctctccagt aggtgtctag cttatttgc
 541 aacaacatga aaccagaaaa ccaacaaaaa tattttagaa ttttgcctc tggggtttc
 10 601 caataccag agcatcaacc catgctattt ggactgttc tgctcatgtt tgggtcgtc
 661 gtgcttgga atcttctcat cattctggcc gtcagcattg actctcacct gcatactccc
 721 atgtacttct ttctatctaa cctgtcctt tctgacattg gtttcctc tacaactgc
 781 cctaagatgt tggtaatat ccaaacacag agcaagtcca tctctatgc agaatgcac
 841 accagattt atttttcat gctcttggga ggcatggaca cacttctct caccgtgatg
 15 901 gccttagacc gatttggc catctgtcac ccacttact attcagtcat tatgaatcct
 961 caactaagt gtttctagt tctgtatca tggtttatta gctttcata ttctctgata
 1021 cagagtctat tgatgtcgc gttgtcctc tgtacaaac agataattaa acacttttac
 1081 tgtgaatag ccaaaacct cactatagcc tgctcagata cactaatcaa tcatactct
 1141 ctttatattg tgatatggg ccttgcttc atcccttct caggatcct ttattcatac
 20 1201 tataaaattt ttcttcaat ttgagaatt ccatcaacag atggaaaata taaagcatt
 1261 tctacctgtg ggtctcatc atcggtggtt tcttattct atgggacagg ccttagtgtg
 1321 taccttagtt ctgatgtac ttctctctc gggaaggcgc tgggtggcctc agtaattgat
 1381 acagtggta ccccatgct gaacccttc atctacagct tgaggaacaa agacattaag
 1441 aaggccctaa aaacacttg gagaatactt ctttaaagt gataattca ctggttttag
 25 1501 acatctgaac tgatagaaat aaaatagta actaaagaaa ttctgtacta taatcatgta
 1561 gaaattttat ccagtttgtt ggtctatctt tgattaaaat tatactgtga atatttctat
 1621 ctgaaatttc tatgatgct cttttttat tgaagtctt ttgtctcct cctgtttta
 1681 tacgacatat ttcttactt cagtacaaag tctacattc agcatgcaa tataaccatt
 1741 caaatacca ttcatgaatt gtttagtaa agttatgcaa tggctcatt acagaaagtc
 30 1801 catgtatata tatatacac tgtgtgggt tggctcgact ctgtattctg atattaattc
 1861 tgcag (SEQ ID NO:431).

As used herein, the terms “ORX nucleic acid sequence” and/or “ORX nucleic acid molecule” specifically refer to the sequences of GenBank Accession Nos. AF022649,
 35 AF073959-073989, AF127814-127907, and AF179716-179843.

Likewise, the term “ORX polypeptide” specifically refers to the polypeptide sequences of GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886,
 40 AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-

179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839, AF179841-179843, and AF073959-073989.

To sample the ORX genes in primate species, ORX genes were randomly sequenced from anthropoids and prosimians (*See* FIG. 1). As outlined in Examples 1-3, *infra*, ORX genes were obtained by PCR on genomic DNA from the different species using consensus ORX primer pairs OR5B-OR3B and OR3.1-OR7.1 chosen respectively in the transmembrane domains TM2 and TM7, and TM3 and TM7. Except for humans, eighteen to thirty-five individual ORX clones were sequenced per taxon. A total of 221 ORX sequences, representing ten species, was analyzed. These sequences are distributed in different groups whose percentage of nucleotide sequence identity (NSI) ranges from ~35 to >99%. The corresponding amino acid sequences were compared to a variety of ORX sequences from the public databases and previous studies. *See* Rouquier et al., (1998) *Nature Genet.* 18, 243-50.

All sequences have the characteristic features of olfactory receptors, with a heptahelical structure and conserved motifs as previously defined. *See* Buck et al., (1991) *Cell* 65, 175-187; Rouquier et al., (1998) *Nature Genet.* 18, 243-50; and Rouquier et al., (1998) *Hum. Mol. Genet.* 7, 1337-45. The use of two pairs of consensus primers made the sampling representative of the ORX gene repertoire. Primate sequences are distributed in seven families (sequences that share >40% amino-acid identity (ASI) define a family), and 56 subfamilies (sequences that share >60% ASI define a subfamily). Group 1-II of family 1 represents the zone of overlap of sequences derived from using the two primer pairs (*See* FIG. 2).

Non-human primate ORX genes are represented in 6 families and about 45 subfamilies. Numerous sequences are grouped in family 1 (~66%) comprising subfamily 1A, the largest subfamily (57/221, 26%). Subfamily 1B is almost devoid of coding human ORX sequences (FIG. 2). Subfamily 1A contains only human pseudogenes originating from chromosomes 14 and 19 whereas subfamily 1B contains human pseudogenes lying on various chromosomes. As has been previously found for human, the amino-acid sequences deduced from the non-human primate sequences revealed many pseudogenes (FIG. 2 and Table 1).

Table 1 provides information about the evolution of the pseudogene fraction along with the evolution of primates. Hominoids present the highest fraction of pseudogenes (39 to >70%, average ~50%). Old world monkeys (macaque and baboon) have a lower pseudogene fraction

(20 to 35%, average 27%), while even fewer pseudogenes were found among the sequences derived from new world monkeys. Only one pseudogene (SBO64) was identified among the 49 sequences obtained from marmoset and two species of squirrel-monkey. In contrast, 37% of the prosimian lemur ORX sequences were pseudogenes.

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TABLE 1

Species								
	Common name		Number of sequences analyzed	% ORF	% pseudogenes	Average % pseudogenes		
Hominoids	Human	Homo sapiens (HSA)	99	30	70	50 %		
	Chimpanzee	Pan troglodytes (PTR)	21	52	48			
	Gorilla	Gorilla gorilla (GGO)	18	50	50			
	Orangutan	Pongo pygmaeus (PPY)	23	61	39			
	Gibbon	Hylobates lar (HLA)	22	59	41			
Old world monkeys	Macaque	Macaca sylvanus (MSY)	20	65	35	27 %		
	Baboon	Papio papio (PPA)	21	81	19			
New world monkeys	Marmoset	Callithrix jacchus (CJA)	19	100	0	2 %		
	Squirrel-monkey	Saimiri sciurus (SSC)	15	100	0			
		Saimiri boliviensis (SBO)	15	93	7			

Prosimians	Lemur	Eulemur fulvus (EFU)	19	58	42	37 %
		Eulemur rubriventer (ERU)	16	69	31	
Rodents	Mouse	Mus musculus (MMU)	33	100	0	0 %
Fish	Zebrafish	Danio rerio (DRE)	3	100	0	0 %

Diverse reasons have been suggested that could account for the differences in olfactory ability among mammals, *i.e.*, the size of the anatomical structures devoted to olfaction (olfactory epithelium, olfactory bulb, cortical structures), or the number of ORX families/subfamilies, and the total number and diversity of expressed ORX genes. The olfactory epithelial surface of macrosmatic animals, such as dogs, is larger than in microsmatic humans. On the other hand, using unique dog sequence probes that represent specific ORX subfamilies and which will not cross-hybridize with other subfamilies, comparative analyses have been performed by Southern blot analysis among a panel of mammals including dog and human. The number of ORX sequences per subfamily is similar in microsmatic and macrosmatic animals. A high fraction (>70%) of the human ORX genes have been mutated during evolution into pseudogenes. Chromosomes 7, 16 or 17 contained a high fraction of potentially coding ORX sequences, whereas other chromosomes such as chromosome 3 or 11 contained primarily pseudogenes. Other studies on chromosome 17 and on chromosome 11 in which 75% of the ORX sequences identified were pseudogenes, support these observations.

All ORX sequences derived from mouse are potentially coding. No pseudogenes were detected either by sequencing randomly selected ORX sequences or by deliberately screening with human ORX pseudogene probes. This indicates that the ORX pseudogene content is either zero or restricted to rare examples in mouse.

Thus, the reduction of the sense of smell could correlate with the fraction of functional ORX genes in the genome.

It is difficult to measure and compare the olfactory efficiency of different animal species. Various parameters such as the threshold of detection of odorants (sensitivity), the range of odors detectable and the discriminatory power (acuity) are key parts of the olfactory ability. Thus it is uncertain to determine precisely which of these parameters are taken in account when comparing two species, and therefore the origin of the olfactory deficiency of primates remains a controversial and difficult point to address.

The chromosomal distribution of the ORX gene repertoire arose through multiple duplication rounds giving rise to paralogous regions. Even though the number of duplication events may be different among the mammals, overall it appears that the number of ORX genes was established before the divergence of mammals. See Ben-Arie et al., (1994) *Hum. Mol.*

Genet. 3, 229-35. This explains why, by Southern analysis, there is no striking difference in the number of ORX genes of four different subfamilies between the sea lion, which has an underdeveloped olfactory apparatus, and other mammals. *See id.* On the other hand, the Southern blot approach does not reveal the functionality of the ORX sequences, and we predict that a large fraction of the sea lion ORX genes could be pseudogenes as has been described for the dolphin. *See Sharon et al., (1999) Genomics, 61, 24-36.* Similarly striking differences have been observed in the olfactory ability of different breeds of dogs. *See Issel-Tarver et al., (1996) Proc. Natl. Acad. Sci. USA 93, 10897-902.* Despite the variations in the size of the olfactory epithelium of the different breeds, it would be interesting to know what the biological basis is for the differences in performances observed between sight and scent hounds. One obvious possibility is loss of functional ORX genes, but, given the recent origin of all modern dogs this explanation seems unlikely. Other explanations could be changes in behavior, or in expression brought about by the modification of a key master transcription factor or in the unusual mechanism that allows only one ORX gene allele or the other to be expressed exclusively in any one epithelium cell.

ORX Nucleic Acids

The nucleic acids of the invention include those that encode an ORX polypeptide or protein. As used herein, the terms polypeptide and protein are interchangeable.

In some embodiments, an ORX nucleic acid encodes a mature ORX polypeptide. As used herein, a "mature" form of a polypeptide or protein described herein relates to the product of a naturally occurring polypeptide or precursor form or proprotein. The naturally occurring polypeptide, precursor or proprotein includes, by way of nonlimiting example, the full-length gene product, encoded by the corresponding gene. Alternatively, it may be defined as the polypeptide, precursor or proprotein encoded by an open reading frame described herein. The product "mature" form arises, again by way of nonlimiting example, as a result of one or more naturally occurring processing steps that may take place within the cell in which the gene product arises. Examples of such processing steps leading to a "mature" form of a polypeptide or protein include the cleavage of the N-terminal methionine residue encoded by the initiation codon of an open reading frame, or the proteolytic cleavage of a signal peptide or leader sequence. Thus a

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5 mature form arising from a precursor polypeptide or protein that has residues 1 to N, where residue 1 is the N-terminal methionine, would have residues 2 through N remaining after removal of the N-terminal methionine. Alternatively, a mature form arising from a precursor polypeptide or protein having residues 1 to N, in which an N-terminal signal sequence from residue 1 to residue M is cleaved, would have the residues from residue M+1 to residue N remaining. Further as used herein, a "mature" form of a polypeptide or protein may arise from a step of post-translational modification other than a proteolytic cleavage event. Such additional processes include, by way of non-limiting example, glycosylation, myristoylation or phosphorylation. In general, a mature polypeptide or protein may result from the operation of only one of these processes, or a combination of any of them.

10 Among the ORX nucleic acids is the nucleic acid whose sequence is provided by GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof. Additionally, the invention includes mutant or variant nucleic acids of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a fragment thereof, any of whose bases may be changed from the corresponding bases shown in the ORX nucleic acids, while still encoding a protein that maintains at least one of its ORX-like activities and physiological functions (*i.e.*, modulating angiogenesis, neuronal development). The invention further includes the complement of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, including fragments, derivatives, analogs and homologs thereof. The invention additionally includes nucleic acids or nucleic acid fragments, or complements thereto, whose structures include chemical modifications.

20 One aspect of the invention pertains to isolated nucleic acid molecules that encode ORX proteins or biologically active portions thereof. Also included are nucleic acid fragments sufficient for use as hybridization probes to identify ORX-encoding nucleic acids (*e.g.*, ORX mRNA) and fragments for use as polymerase chain reaction (PCR) primers for the amplification or mutation of ORX nucleic acid molecules. As used herein, the term "nucleic acid molecule" is intended to include DNA molecules (*e.g.*, cDNA or genomic DNA), RNA molecules (*e.g.*, mRNA), analogs of the DNA or RNA generated using nucleotide analogs, and derivatives,

fragments and homologs thereof. The nucleic acid molecule can be single-stranded or double-stranded, but preferably is double-stranded DNA.

"Probes" refer to nucleic acid sequences of variable length, preferably between at least about 10 nucleotides (nt), 100 nt, or as many as about, *e.g.*, 6,000 nt, depending on use. Probes are used in the detection of identical, similar, or complementary nucleic acid sequences. Longer length probes are usually obtained from a natural or recombinant source, are highly specific and much slower to hybridize than oligomers. Probes may be single- or double-stranded and designed to have specificity in PCR, membrane-based hybridization technologies, or ELISA-like technologies.

An "isolated" nucleic acid molecule is one that is separated from other nucleic acid molecules that are present in the natural source of the nucleic acid. Examples of isolated nucleic acid molecules include, but are not limited to, recombinant DNA molecules contained in a vector, recombinant DNA molecules maintained in a heterologous host cell, partially or substantially purified nucleic acid molecules, and synthetic DNA or RNA molecules. Preferably, an "isolated" nucleic acid is free of sequences which naturally flank the nucleic acid (*i.e.*, sequences located at the 5' and 3' ends of the nucleic acid) in the genomic DNA of the organism from which the nucleic acid is derived. For example, in various embodiments, the isolated ORX nucleic acid molecule can contain less than about 50 kb, 25 kb, 5 kb, 4 kb, 3 kb, 2 kb, 1 kb, 0.5 kb or 0.1 kb of nucleotide sequences which naturally flank the nucleic acid molecule in genomic DNA of the cell from which the nucleic acid is derived. Moreover, an "isolated" nucleic acid molecule, such as a cDNA molecule, can be substantially free of other cellular material or culture medium when produced by recombinant techniques, or of chemical precursors or other chemicals when chemically synthesized.

A nucleic acid molecule of the present invention, *e.g.*, a nucleic acid molecule having the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or a complement of any of these nucleotide sequences, can be isolated using standard molecular biology techniques and the sequence information provided herein. Using all or a portion of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, as a hybridization probe, ORX nucleic acid sequences can be isolated using standard

hybridization and cloning techniques (*e.g.*, as described in Sambrook *et al.*, eds., MOLECULAR CLONING: A LABORATORY MANUAL 2nd Ed., Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, 1989; and Ausubel, *et al.*, eds., CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993.)

5 A nucleic acid of the invention can be amplified using cDNA, mRNA or alternatively, genomic DNA, as a template and appropriate oligonucleotide primers according to standard PCR amplification techniques. The nucleic acid so amplified can be cloned into an appropriate vector and characterized by DNA sequence analysis. Furthermore, oligonucleotides corresponding to ORX nucleotide sequences can be prepared by standard synthetic techniques, *e.g.*, using an
10 automated DNA synthesizer.

As used herein, the term "oligonucleotide" refers to a series of linked nucleotide residues, which oligonucleotide has a sufficient number of nucleotide bases to be used in a PCR reaction. A short oligonucleotide sequence may be based on, or designed from, a genomic or cDNA
15 complementary DNA or RNA in a particular cell or tissue. Oligonucleotides comprise portions of a nucleic acid sequence having about 10 nt, 50 nt, or 100 nt in length, preferably about 15 nt to 30 nt in length. In one embodiment, an oligonucleotide comprising a nucleic acid molecule less than 100 nt in length would further comprise at least 6 contiguous nucleotides of GenBank
Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843,
20 or a complement thereof. Oligonucleotides may be chemically synthesized and may be used as probes.

In another embodiment, an isolated nucleic acid molecule of the invention comprises a nucleic acid molecule that is a complement of the nucleotide sequences shown in GenBank
Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843,
25 or a portion of this nucleotide sequence. A nucleic acid molecule that is complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 is one that is sufficiently complementary to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 that it can hydrogen bond with little or no

mismatches to the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, thereby forming a stable duplex.

As used herein, the term "complementary" refers to Watson-Crick or Hoogsteen base pairing between nucleotide units of a nucleic acid molecule, and the term "binding" means the physical or chemical interaction between two polypeptides or compounds or associated polypeptides or compounds or combinations thereof. Binding includes ionic, non-ionic, Von der Waals, hydrophobic interactions, etc. A physical interaction can be either direct or indirect. Indirect interactions may be through or due to the effects of another polypeptide or compound. Direct binding refers to interactions that do not take place through, or due to, the effect of another polypeptide or compound, but instead are without other substantial chemical intermediates.

Moreover, the nucleic acid molecule of the invention can comprise only a portion of the nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, *e.g.*, a fragment that can be used as a probe or primer, or a fragment encoding a biologically active portion of ORX. Fragments provided herein are defined as sequences of at least 6 (contiguous) nucleic acids or at least 4 (contiguous) amino acids, a length sufficient to allow for specific hybridization in the case of nucleic acids or for specific recognition of an epitope in the case of amino acids, respectively, and are at most some portion less than a full length sequence. Fragments may be derived from any contiguous portion of a nucleic acid or amino acid sequence of choice. Derivatives are nucleic acid sequences or amino acid sequences formed from the native compounds either directly or by modification or partial substitution. Analogs are nucleic acid sequences or amino acid sequences that have a structure similar to, but not identical to, the native compound but differs from it in respect to certain components or side chains. Analogs may be synthetic or from a different evolutionary origin and may have a similar or opposite metabolic activity compared to wild type.

Derivatives and analogs may be full length or other than full length, if the derivative or analog contains a modified nucleic acid or amino acid, as described below. Derivatives or analogs of the nucleic acids or proteins of the invention include, but are not limited to, molecules comprising regions that are substantially homologous to the nucleic acids or proteins of the invention, in various embodiments, by at least about 70%, 80%, 85%, 90%, 95%, 98%, or even 99% identity (with a preferred identity of 80-99%) over a nucleic acid or amino acid sequence of

identical size or when compared to an aligned sequence in which the alignment is done by a computer homology program known in the art, or whose encoding nucleic acid is capable of hybridizing to the complement of a sequence encoding the aforementioned proteins under stringent, moderately stringent, or low stringent conditions. See *e.g.* Ausubel, *et al.*, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, New York, NY, 1993, and below. An exemplary program is the Gap program (Wisconsin Sequence Analysis Package, Version 8 for UNIX, Genetics Computer Group, University Research Park, Madison, WI) using the default settings, which uses the algorithm of Smith and Waterman (Adv. Appl. Math., 1981, 2: 482-489, which is incorporated herein by reference in its entirety).

A "homologous nucleic acid sequence" or "homologous amino acid sequence," or variations thereof, refer to sequences characterized by a homology at the nucleotide level or amino acid level as discussed above. Homologous nucleotide sequences encode those sequences coding for isoforms of an ORX polypeptide. Isoforms can be expressed in different tissues of the same organism as a result of, for example, alternative splicing of RNA. Alternatively, isoforms can be encoded by different genes. In the present invention, homologous nucleotide sequences include nucleotide sequences encoding for an ORX polypeptide of species other than humans, including, but not limited to, mammals, and thus can include, *e.g.*, mouse, rat, rabbit, dog, cat, cow, horse, and other organisms. Homologous nucleotide sequences also include, but are not limited to, naturally occurring allelic variations and mutations of the nucleotide sequences set forth herein. A homologous nucleotide sequence does not, however, include the nucleotide sequence encoding human ORX protein. Homologous nucleic acid sequences include those nucleic acid sequences that encode conservative amino acid substitutions (see below) in the amino acid sequence of an ORX polypeptide, as well as a polypeptide having ORX activity. Biological activities of the ORX proteins are described below. A homologous amino acid sequence does not encode the amino acid sequence of a human ORX polypeptide.

The nucleotide sequence determined from the cloning of the human ORX gene allows for the generation of probes and primers designed for use in identifying and/or cloning ORX homologues in other cell types, *e.g.*, from other tissues, as well as ORX homologues from other mammals. The probe/primer typically comprises a substantially purified oligonucleotide. The oligonucleotide typically comprises a region of nucleotide sequence that hybridizes under

stringent conditions to at least about 12, 25, 50, 100, 150, 200, 250, 300, 350 or 400 or more consecutive sense strand nucleotide sequences of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843; or an anti-sense strand nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843; or of a naturally occurring mutant of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

Probes based on the human ORX nucleotide sequence can be used to detect transcripts or genomic sequences encoding the same or homologous proteins. In various embodiments, the probe further comprises a label group attached thereto, *e.g.*, the label group can be a radioisotope, a fluorescent compound, an enzyme, or an enzyme co-factor. Such probes can be used as a part of a diagnostic test kit for identifying cells or tissue which misexpress an ORX protein, such as by measuring a level of an ORX-encoding nucleic acid in a sample of cells from a subject *e.g.*, detecting ORX mRNA levels or determining whether a genomic ORX gene has been mutated or deleted.

A "polypeptide having a biologically active portion of ORX" refers to polypeptides exhibiting activity similar, but not necessarily identical to, an activity of a polypeptide of the present invention, including mature forms, as measured in a particular biological assay, with or without dose dependency. A nucleic acid fragment encoding a "biologically active portion of ORX" can be prepared by isolating a portion of an ORX nucleic acid that encodes a polypeptide having an ORX biological activity (biological activities of the ORX proteins are described below), expressing the encoded portion of ORX protein (*e.g.*, by recombinant expression *in vitro*) and assessing the activity of the encoded portion of ORX. For example, a nucleic acid fragment encoding a biologically active portion of ORX can optionally include an ATP-binding domain. In another embodiment, a nucleic acid fragment encoding a biologically active portion of ORX includes one or more regions.

ORX Variants

The invention further encompasses nucleic acid molecules that differ from the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 due to the degeneracy of the genetic code. These nucleic acid

molecules thus encode the same ORX protein as that encoded by the nucleotide sequences shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 *e.g.*, the ORX polypeptides.

In addition to the human ORX nucleic acids, it will be appreciated by those skilled in the art that DNA sequence polymorphisms that lead to changes in the amino acid sequences of ORX may exist within a population (*e.g.*, the human population). Such genetic polymorphism in the ORX gene may exist among individuals within a population due to natural allelic variation. As used herein, the terms "gene" and "recombinant gene" refer to nucleic acid molecules comprising an open reading frame encoding an ORX protein, preferably a mammalian ORX protein. Such natural allelic variations can typically result in 1-5% variance in the nucleotide sequence of the ORX gene. Any and all such nucleotide variations and resulting amino acid polymorphisms in ORX that are the result of natural allelic variation and that do not alter the functional activity of ORX are intended to be within the scope of the invention.

Moreover, nucleic acid molecules encoding ORX proteins from other species, and thus that have a nucleotide sequence that differs from the human sequence of the ORX nucleic acid molecules are intended to be within the scope of the invention. Nucleic acid molecules corresponding to natural allelic variants and homologues of the ORX cDNAs of the invention can be isolated based on their homology to the human ORX nucleic acids disclosed herein using the human cDNAs, or a portion thereof, as a hybridization probe according to standard hybridization techniques under stringent hybridization conditions. For example, a soluble human ORX cDNA can be isolated based on its homology to human membrane-bound ORX. Likewise, a membrane-bound human ORX cDNA can be isolated based on its homology to soluble human ORX.

Accordingly, in another embodiment, an isolated nucleic acid molecule of the invention is at least 6 nucleotides in length and hybridizes under stringent conditions to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. In another embodiment, the nucleic acid is at least 10, 25, 50, 100, 250, 500 or 750 nucleotides in length. In another embodiment, an isolated nucleic acid molecule of the invention hybridizes to the coding region. As used herein, the term "hybridizes under stringent conditions" is intended to describe

conditions for hybridization and washing under which nucleotide sequences at least 60% homologous to each other typically remain hybridized to each other.

Homologs (*i.e.*, nucleic acids encoding ORX proteins derived from species other than human) or other related sequences (*e.g.*, paralogs) can be obtained by low, moderate or high stringency hybridization with all or a portion of the particular human sequence as a probe using methods well known in the art for nucleic acid hybridization and cloning.

As used herein, the phrase "stringent hybridization conditions" refers to conditions under which a probe, primer or oligonucleotide will hybridize to its target sequence, but to no other sequences. Stringent conditions are sequence-dependent and will be different in different circumstances. Longer sequences hybridize specifically at higher temperatures than shorter sequences. Generally, stringent conditions are selected to be about 5 °C lower than the thermal melting point (T_m) for the specific sequence at a defined ionic strength and pH. The T_m is the temperature (under defined ionic strength, pH and nucleic acid concentration) at which 50% of the probes complementary to the target sequence hybridize to the target sequence at equilibrium. Since the target sequences are generally present at excess, at T_m , 50% of the probes are occupied at equilibrium. Typically, stringent conditions will be those in which the salt concentration is less than about 1.0 M sodium ion, typically about 0.01 to 1.0 M sodium ion (or other salts) at pH 7.0 to 8.3 and the temperature is at least about 30 °C for short probes, primers or oligonucleotides (*e.g.*, 10 nt to 50 nt) and at least about 60°C for longer probes, primers and oligonucleotides. Stringent conditions may also be achieved with the addition of destabilizing agents, such as formamide.

Stringent conditions are known to those skilled in the art and can be found in CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, N.Y. (1989), 6.3.1-6.3.6. Preferably, the conditions are such that sequences at least about 65%, 70%, 75%, 85%, 90%, 95%, 98%, or 99% homologous to each other typically remain hybridized to each other. A non-limiting example of stringent hybridization conditions is hybridization in a high salt buffer comprising 6X SSC, 50 mM Tris-HCl (pH 7.5), 1 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.02% BSA, and 500 mg/ml denatured salmon sperm DNA at 65 °C. This hybridization is followed by one or more washes in 0.2X SSC, 0.01% BSA at 50 °C. An isolated nucleic acid molecule of the invention that hybridizes under stringent conditions to the sequence of GenBank Accession Numbers

AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 corresponds to a naturally occurring nucleic acid molecule. As used herein, a "naturally-occurring" nucleic acid molecule refers to an RNA or DNA molecule having a nucleotide sequence that occurs in nature (*e.g.*, encodes a natural protein).

5 In a second embodiment, a nucleic acid sequence that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of moderate stringency is provided. A non-limiting example of moderate stringency hybridization conditions are hybridization in 6X SSC, 5X
10 Denhardt's solution, 0.5% SDS and 100 mg/ml denatured salmon sperm DNA at 55°C, followed by one or more washes in 1X SSC, 0.1% SDS at 37 °C. Other conditions of moderate stringency that may be used are well known in the art. See, *e.g.*, Ausubel *et al.* (eds.), 1993, CURRENT PROTOCOLS IN MOLECULAR BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY.

15 In a third embodiment, a nucleic acid that is hybridizable to the nucleic acid molecule comprising the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, or fragments, analogs or derivatives thereof, under conditions of low stringency, is provided. A non-limiting example of low stringency hybridization conditions are hybridization in 35% formamide, 5X SSC, 50 mM
20 Tris-HCl (pH 7.5), 5 mM EDTA, 0.02% PVP, 0.02% Ficoll, 0.2% BSA, 100 mg/ml denatured salmon sperm DNA, 10% (wt/vol) dextran sulfate at 40 °C, followed by one or more washes in 2X SSC, 25 mM Tris-HCl (pH 7.4), 5 mM EDTA, and 0.1% SDS at 50 °C. Other conditions of low stringency that may be used are well known in the art (*e.g.*, as employed for cross-species hybridizations). See, *e.g.*, Ausubel *et al.* (eds.), 1993, CURRENT PROTOCOLS IN MOLECULAR
25 BIOLOGY, John Wiley & Sons, NY, and Kriegler, 1990, GENE TRANSFER AND EXPRESSION, A LABORATORY MANUAL, Stockton Press, NY; Shilo and Weinberg, 1981, *Proc Natl Acad Sci USA* 78: 6789-6792.

Conservative mutations

In addition to naturally-occurring allelic variants of the ORX sequence that may exist in the population, the skilled artisan will further appreciate that changes can be introduced by mutation into the nucleotide sequence of the ORX nucleic acid molecules, thereby leading to changes in the amino acid sequence of the encoded ORX protein, without altering the functional ability of the ORX protein. For example, nucleotide substitutions leading to amino acid substitutions at "non-essential" amino acid residues can be made in the sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843. A "non-essential" amino acid residue is a residue that can be altered from the wild-type sequence of ORX without altering the biological activity, whereas an "essential" amino acid residue is required for biological activity. For example, amino acid residues that are conserved among the ORX proteins of the present invention, are predicted to be particularly unamenable to alteration.

Another aspect of the invention pertains to nucleic acid molecules encoding ORX proteins that contain changes in amino acid residues that are not essential for activity. Such ORX proteins differ in amino acid sequence from the ORX polypeptides, yet retain biological activity. In one embodiment, the isolated nucleic acid molecule comprises a nucleotide sequence encoding a protein, wherein the protein comprises an amino acid sequence at least about 75% homologous to the amino acid sequence of the ORX polypeptides. Preferably, the protein encoded by the nucleic acid is at least about 80% homologous to the sequence of an ORX polypeptide, more preferably at least about 90%, 95%, 98%, and most preferably at least about 99% homologous to the sequence of an ORX polypeptide.

An isolated nucleic acid molecule encoding an ORX protein homologous to the protein of can be created by introducing one or more nucleotide substitutions, additions or deletions into the nucleotide sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, such that one or more amino acid substitutions, additions or deletions are introduced into the encoded protein.

Mutations can be introduced into the nucleotide sequence of the ORX nucleic acid molecules by standard techniques, such as site-directed mutagenesis and PCR-mediated mutagenesis. Preferably, conservative amino acid substitutions are made at one or more predicted non-essential amino acid residues. A "conservative amino acid substitution" is one in

which the amino acid residue is replaced with an amino acid residue having a similar side chain. Families of amino acid residues having similar side chains have been defined in the art. These families include amino acids with basic side chains (*e.g.*, lysine, arginine, histidine), acidic side chains (*e.g.*, aspartic acid, glutamic acid), uncharged polar side chains (*e.g.*, glycine, asparagine, glutamine, serine, threonine, tyrosine, cysteine), nonpolar side chains (*e.g.*, alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan), beta-branched side chains (*e.g.*, threonine, valine, isoleucine) and aromatic side chains (*e.g.*, tyrosine, phenylalanine, tryptophan, histidine). Thus, a predicted nonessential amino acid residue in ORX is replaced with another amino acid residue from the same side chain family. Alternatively, in another embodiment, mutations can be introduced randomly along all or part of an ORX coding sequence, such as by saturation mutagenesis, and the resultant mutants can be screened for ORX biological activity to identify mutants that retain activity. Following mutagenesis of the ORX nucleic acid molecule, the encoded protein can be expressed by any recombinant technology known in the art and the activity of the protein can be determined.

In one embodiment, a mutant ORX protein can be assayed for (1) the ability to form protein:protein interactions with other ORX proteins, other cell-surface proteins, or biologically active portions thereof, (2) complex formation between a mutant ORX protein and an ORX receptor; (3) the ability of a mutant ORX protein to bind to an intracellular target protein or biologically active portion thereof; (*e.g.*, avidin proteins); (4) the ability to bind ORX protein; or (5) the ability to specifically bind an anti-ORX protein antibody.

Antisense ORX Nucleic Acids

Another aspect of the invention pertains to isolated antisense nucleic acid molecules that are hybridizable to or complementary to the nucleic acid molecule comprising the nucleotide sequence of the ORX nucleic acid molecule, or fragments, analogs or derivatives thereof. An "antisense" nucleic acid comprises a nucleotide sequence that is complementary to a "sense" nucleic acid encoding a protein, *e.g.*, complementary to the coding strand of a double-stranded cDNA molecule or complementary to an mRNA sequence. In specific aspects, antisense nucleic acid molecules are provided that comprise a sequence complementary to at least about 10, 25, 50, 100, 250 or 500 nucleotides or an entire ORX coding strand, or to only a portion thereof.

Nucleic acid molecules encoding fragments, homologs, derivatives and analogs of an ORX protein or antisense nucleic acids complementary to an ORX nucleic acid sequence of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 are additionally provided.

5 In one embodiment, an antisense nucleic acid molecule is antisense to a "coding region" of the coding strand of a nucleotide sequence encoding ORX. The term "coding region" refers to the region of the nucleotide sequence comprising codons which are translated into amino acid residues. In another embodiment, the antisense nucleic acid molecule is antisense to a "noncoding region" of the coding strand of a nucleotide sequence encoding ORX. The term
10 "noncoding region" refers to 5' and 3' sequences which flank the coding region that are not translated into amino acids (*i.e.*, also referred to as 5' and 3' untranslated regions).

Given the coding strand sequences encoding ORX disclosed herein, antisense nucleic acids of the invention can be designed according to the rules of Watson and Crick or Hoogsteen base pairing. The antisense nucleic acid molecule can be complementary to the entire coding region of ORX mRNA, but more preferably is an oligonucleotide that is antisense to only a portion of the coding or noncoding region of ORX mRNA. For example, the antisense oligonucleotide can be complementary to the region surrounding the translation start site of ORX mRNA. An antisense oligonucleotide can be, for example, about 5, 10, 15, 20, 25, 30, 35, 40, 45 or 50 nucleotides in length. An antisense nucleic acid of the invention can be constructed using
15 chemical synthesis or enzymatic ligation reactions using procedures known in the art. For example, an antisense nucleic acid (*e.g.*, an antisense oligonucleotide) can be chemically synthesized using naturally occurring nucleotides or variously modified nucleotides designed to increase the biological stability of the molecules or to increase the physical stability of the duplex formed between the antisense and sense nucleic acids, *e.g.*, phosphorothioate derivatives and
20 acridine substituted nucleotides can be used.

Examples of modified nucleotides that can be used to generate the antisense nucleic acid include: 5-fluorouracil, 5-bromouracil, 5-chlorouracil, 5-iodouracil, hypoxanthine, xanthine, 4-acetylcytosine, 5-(carboxyhydroxymethyl) uracil, 5-carboxymethylaminomethyl-
2-thiouridine, 5-carboxymethylaminomethyluracil, dihydrouracil, beta-D-galactosylqueosine,
30 inosine, N6-isopentenyladenine, 1-methylguanine, 1-methylinosine, 2,2-dimethylguanine,

2-methyladenine, 2-methylguanine, 3-methylcytosine, 5-methylcytosine, N6-adenine, 7-methylguanine, 5-methylaminomethyluracil, 5-methoxyaminomethyl-2-thiouracil, beta-D-mannosylqueosine, 5'-methoxycarboxymethyluracil, 5-methoxyuracil, 2-methylthio-N6-isopentenyladenine, uracil-5-oxyacetic acid (v), wybutoxosine, pseudouracil, queosine, 2-thiocytosine, 5-methyl-2-thiouracil, 2-thiouracil, 4-thiouracil, 5-methyluracil, uracil-5-oxyacetic acid methylester, uracil-5-oxyacetic acid (v), 5-methyl-2-thiouracil, 3-(3-amino-3-N-2-carboxypropyl) uracil, (acp3)w, and 2,6-diaminopurine. Alternatively, the antisense nucleic acid can be produced biologically using an expression vector into which a nucleic acid has been subcloned in an antisense orientation (*i.e.*, RNA transcribed from the inserted nucleic acid will be of an antisense orientation to a target nucleic acid of interest, described further in the following subsection).

The antisense nucleic acid molecules of the invention are typically administered to a subject or generated *in situ* such that they hybridize with or bind to cellular mRNA and/or genomic DNA encoding an ORX protein to thereby inhibit expression of the protein, *e.g.*, by inhibiting transcription and/or translation. The hybridization can be by conventional nucleotide complementarity to form a stable duplex, or, for example, in the case of an antisense nucleic acid molecule that binds to DNA duplexes, through specific interactions in the major groove of the double helix. An example of a route of administration of antisense nucleic acid molecules of the invention includes direct injection at a tissue site. Alternatively, antisense nucleic acid molecules can be modified to target selected cells and then administered systemically. For example, for systemic administration, antisense molecules can be modified such that they specifically bind to receptors or antigens expressed on a selected cell surface, *e.g.*, by linking the antisense nucleic acid molecules to peptides or antibodies that bind to cell surface receptors or antigens. The antisense nucleic acid molecules can also be delivered to cells using the vectors described herein. To achieve sufficient intracellular concentrations of antisense molecules, vector constructs in which the antisense nucleic acid molecule is placed under the control of a strong pol II or pol III promoter are preferred.

In yet another embodiment, the antisense nucleic acid molecule of the invention is an α -anomeric nucleic acid molecule. An α -anomeric nucleic acid molecule forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual β -units, the

strands run parallel to each other (Gaultier *et al.* (1987) *Nucleic Acids Res* 15: 6625-6641). The antisense nucleic acid molecule can also comprise a 2'-o-methylribonucleotide (Inoue *et al.* (1987) *Nucleic Acids Res* 15: 6131-6148) or a chimeric RNA -DNA analogue (Inoue *et al.* (1987) *FEBS Lett* 215: 327-330).

Such modifications include, by way of nonlimiting example, modified bases, and nucleic acids whose sugar phosphate backbones are modified or derivatized. These modifications are carried out at least in part to enhance the chemical stability of the modified nucleic acid, such that they may be used, for example, as antisense binding nucleic acids in therapeutic applications in a subject.

ORX Ribozymes and PNA moieties

In still another embodiment, an antisense nucleic acid of the invention is a ribozyme. Ribozymes are catalytic RNA molecules with ribonuclease activity that are capable of cleaving a single-stranded nucleic acid, such as a mRNA, to which they have a complementary region. Thus, ribozymes (*e.g.*, hammerhead ribozymes (described in Haselhoff and Gerlach (1988) *Nature* 334:585-591)) can be used to catalytically cleave ORX mRNA transcripts to thereby inhibit translation of ORX mRNA. A ribozyme having specificity for an ORX-encoding nucleic acid can be designed based upon the nucleotide sequence of an ORX DNA disclosed herein. For example, a derivative of a Tetrahymena L-19 IVS RNA can be constructed in which the nucleotide sequence of the active site is complementary to the nucleotide sequence to be cleaved in an ORX-encoding mRNA. See, *e.g.*, Cech *et al.* U.S. Pat. No. 4,987,071; and Cech *et al.* U.S. Pat. No. 5,116,742. Alternatively, ORX mRNA can be used to select a catalytic RNA having a specific ribonuclease activity from a pool of RNA molecules. See, *e.g.*, Bartel *et al.*, (1993) *Science* 261:1411-1418.

Alternatively, ORX gene expression can be inhibited by targeting nucleotide sequences complementary to the regulatory region of the ORX (*e.g.*, the ORX promoter and/or enhancers) to form triple helical structures that prevent transcription of the ORX gene in target cells. See generally, Helene. (1991) *Anticancer Drug Des.* 6: 569-84; Helene. *et al.* (1992) *Ann. N.Y. Acad. Sci.* 660:27-36; and Maher (1992) *Bioassays* 14: 807-15.

In various embodiments, the nucleic acids of ORX can be modified at the base moiety, sugar moiety or phosphate backbone to improve, *e.g.*, the stability, hybridization, or solubility of the molecule. For example, the deoxyribose phosphate backbone of the nucleic acids can be modified to generate peptide nucleic acids (see Hyrup *et al.* (1996) *Bioorg Med Chem* 4: 5-23).

As used herein, the terms "peptide nucleic acids" or "PNAs" refer to nucleic acid mimics, *e.g.*, DNA mimics, in which the deoxyribose phosphate backbone is replaced by a pseudopeptide backbone and only the four natural nucleobases are retained. The neutral backbone of PNAs has been shown to allow for specific hybridization to DNA and RNA under conditions of low ionic strength. The synthesis of PNA oligomers can be performed using standard solid phase peptide synthesis protocols as described in Hyrup *et al.* (1996) above; Perry-O'Keefe *et al.* (1996) *PNAS* 93: 14670-675.

PNAs of ORX can be used in therapeutic and diagnostic applications. For example, PNAs can be used as antisense or antigene agents for sequence-specific modulation of gene expression by, *e.g.*, inducing transcription or translation arrest or inhibiting replication. PNAs of ORX can also be used, *e.g.*, in the analysis of single base pair mutations in a gene by, *e.g.*, PNA directed PCR clamping; as artificial restriction enzymes when used in combination with other enzymes, *e.g.*, S1 nucleases (Hyrup B. (1996) above); or as probes or primers for DNA sequence and hybridization (Hyrup *et al.* (1996), above; Perry-O'Keefe (1996), above).

In another embodiment, PNAs of ORX can be modified, *e.g.*, to enhance their stability or cellular uptake, by attaching lipophilic or other helper groups to PNA, by the formation of PNA-DNA chimeras, or by the use of liposomes or other techniques of drug delivery known in the art. For example, PNA-DNA chimeras of ORX can be generated that may combine the advantageous properties of PNA and DNA. Such chimeras allow DNA recognition enzymes, *e.g.*, RNase H and DNA polymerases, to interact with the DNA portion while the PNA portion would provide high binding affinity and specificity. PNA-DNA chimeras can be linked using linkers of appropriate lengths selected in terms of base stacking, number of bonds between the nucleobases, and orientation (Hyrup (1996) above). The synthesis of PNA-DNA chimeras can be performed as described in Hyrup (1996) above and Finn *et al.* (1996) *Nucl Acids Res* 24: 3357-63. For example, a DNA chain can be synthesized on a solid support using standard phosphoramidite coupling chemistry, and modified nucleoside analogs, *e.g.*, 5'-(4-methoxytrityl)

amino-5'-deoxy-thymidine phosphoramidite, can be used between the PNA and the 5' end of DNA (Mag *et al.* (1989) *Nucl Acid Res* 17: 5973-88). PNA monomers are then coupled in a stepwise manner to produce a chimeric molecule with a 5' PNA segment and a 3' DNA segment (Finn *et al.* (1996) above). Alternatively, chimeric molecules can be synthesized with a 5' DNA segment and a 3' PNA segment. See, Petersen *et al.* (1975) *Bioorg Med Chem Lett* 5: 1119-11124.

In other embodiments, the oligonucleotide may include other appended groups such as peptides (*e.g.*, for targeting host cell receptors *in vivo*), or agents facilitating transport across the cell membrane (see, *e.g.*, Letsinger *et al.*, 1989, *Proc. Natl. Acad. Sci. U.S.A.* 86:6553-6556; Lemaitre *et al.*, 1987, *Proc. Natl. Acad. Sci.* 84:648-652; PCT Publication No. W088/09810) or the blood-brain barrier (see, *e.g.*, PCT Publication No. W089/10134). In addition, oligonucleotides can be modified with hybridization triggered cleavage agents (See, *e.g.*, Krol *et al.*, 1988, *BioTechniques* 6:958-976) or intercalating agents. (See, *e.g.*, Zon, 1988, *Pharm. Res.* 5: 539-549). To this end, the oligonucleotide may be conjugated to another molecule, *e.g.*, a peptide, a hybridization triggered cross-linking agent, a transport agent, a hybridization-triggered cleavage agent, etc.

ORX Polypeptides

An ORX polypeptide of the invention includes the ORX-like protein whose sequence is provided in GenBank Accession Nos. AF127814, AF127816-127819, AF127821-127824, AF127836-127837, AF127840, AF127845-127848, AF127851-127852, AF127857, AF127859, AF127861-127862, AF127865, AF127867-127868, AF127870-127872, AF127874-127884, AF127886, AF127888, AF127896-127904, AF127906-127907, AF179716-179717, AF179720-179728, AF179730-179737, AF179739-179746, AF179748-179750, AF179752, AF179755-179756, AF179758-179761, AF179766-179767, AF179770-179771, AF179773-179775, AF179777-179779, AF179784-179788, AF179790-179792, AF179794, AF179796-179799, AF179802-179811, AF179814, AF179816-179818, AF179820, AF179822-179832, AF179834-179839, AF179841-179843, and AF073959-073989. The invention also includes a mutant or variant protein any of whose residues may be changed from the corresponding residue of the ORX polypeptide while still encoding a protein that maintains its ORX-like activities and

physiological functions, or a functional fragment thereof. In some embodiments, up to 20% or more of the residues may be so changed in the mutant or variant protein. In some embodiments, the ORX polypeptide according to the invention is a mature polypeptide.

In general, an ORX -like variant that preserves ORX-like function includes any variant in which residues at a particular position in the sequence have been substituted by other amino acids, and further include the possibility of inserting an additional residue or residues between two residues of the parent protein as well as the possibility of deleting one or more residues from the parent sequence. Any amino acid substitution, insertion, or deletion is encompassed by the invention. In favorable circumstances, the substitution is a conservative substitution as defined above.

One aspect of the invention pertains to isolated ORX proteins, and biologically active portions thereof, or derivatives, fragments, analogs or homologs thereof. Also provided are polypeptide fragments suitable for use as immunogens to raise anti-ORX antibodies. In one embodiment, native ORX proteins can be isolated from cells or tissue sources by an appropriate purification scheme using standard protein purification techniques. In another embodiment, ORX proteins are produced by recombinant DNA techniques. Alternative to recombinant expression, an ORX protein or polypeptide can be synthesized chemically using standard peptide synthesis techniques.

An "isolated" or "purified" protein or biologically active portion thereof is substantially free of cellular material or other contaminating proteins from the cell or tissue source from which the ORX protein is derived, or substantially free from chemical precursors or other chemicals when chemically synthesized. The language "substantially free of cellular material" includes preparations of ORX protein in which the protein is separated from cellular components of the cells from which it is isolated or recombinantly produced. In one embodiment, the language "substantially free of cellular material" includes preparations of ORX protein having less than about 30% (by dry weight) of non-ORX protein (also referred to herein as a "contaminating protein"), more preferably less than about 20% of non-ORX protein, still more preferably less than about 10% of non-ORX protein, and most preferably less than about 5% non-ORX protein. When the ORX protein or biologically active portion thereof is recombinantly produced, it is also preferably substantially free of culture medium, *i.e.*, culture medium represents less than about

20%, more preferably less than about 10%, and most preferably less than about 5% of the volume of the protein preparation.

The language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein in which the protein is separated from chemical precursors or other chemicals that are involved in the synthesis of the protein. In one embodiment, the language "substantially free of chemical precursors or other chemicals" includes preparations of ORX protein having less than about 30% (by dry weight) of chemical precursors or non-ORX chemicals, more preferably less than about 20% chemical precursors or non-ORX chemicals, still more preferably less than about 10% chemical precursors or non-ORX chemicals, and most preferably less than about 5% chemical precursors or non-ORX chemicals.

Biologically active portions of an ORX protein include peptides comprising amino acid sequences sufficiently homologous to or derived from the amino acid sequence of the ORX protein, *e.g.*, the amino acid sequence of the ORX polypeptides that include fewer amino acids than the full length ORX proteins, and exhibit at least one activity of an ORX protein. Typically, biologically active portions comprise a domain or motif with at least one activity of the ORX protein. A biologically active portion of an ORX protein can be a polypeptide which is, for example, 10, 25, 50, 100 or more amino acids in length.

In some embodiments, an ORX protein of the invention includes the amino acid sequence of the herein described polypeptide and a number of amino acids on the amino terminus of the ORX protein, the carboxy terminus of the ORX protein, or a number of amino acids on both termini of the disclosed ORX protein. Thus, the ORX protein can include 1, 2, 3, 4, 5, 10, 15, 20, 25, 50, or 75 or more amino acids on the amino terminus, the carboxy terminus, or both termini of the disclosed amino acid sequence.

A biologically active portion of an ORX protein of the present invention may contain at least one of the above-identified domains conserved between the ORX proteins, *e.g.* TSR modules. Moreover, other biologically active portions, in which other regions of the protein are deleted, can be prepared by recombinant techniques and evaluated for one or more of the functional activities of a native ORX protein.

In an embodiment, the ORX protein has an amino acid sequence of an ORX polypeptides. In other embodiments, the ORX protein is substantially homologous to an ORX polypeptide and

retains the functional activity of the ORX polypeptide yet differs in amino acid sequence due to natural allelic variation or mutagenesis, as described in detail below. Accordingly, in another embodiment, the ORX protein is a protein that comprises an amino acid sequence at least about 45% homologous to the amino acid sequence of an ORX polypeptide and retains the functional activity of the ORX polypeptides.

Determining homology between two or more sequence

To determine the percent homology of two amino acid sequences or of two nucleic acids, the sequences are aligned for optimal comparison purposes (*e.g.*, gaps can be introduced in either of the sequences being compared for optimal alignment between the sequences). The amino acid residues or nucleotides at corresponding amino acid positions or nucleotide positions are then compared. When a position in the first sequence is occupied by the same amino acid residue or nucleotide as the corresponding position in the second sequence, then the molecules are homologous at that position (*i.e.*, as used herein amino acid or nucleic acid "homology" is equivalent to amino acid or nucleic acid "identity").

The nucleic acid sequence homology may be determined as the degree of identity between two sequences. The homology may be determined using computer programs known in the art, such as GAP software provided in the GCG program package. See, *Needleman and Wunsch* 1970 *J Mol Biol* 48: 443-453. Using GCG GAP software with the following settings for nucleic acid sequence comparison: GAP creation penalty of 5.0 and GAP extension penalty of 0.3, the coding region of the analogous nucleic acid sequences referred to above exhibits a degree of identity preferably of at least 70%, 75%, 80%, 85%, 90%, 95%, 98%, or 99%, with the CDS (encoding) part of the DNA sequence shown in GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843.

The term "sequence identity" refers to the degree to which two polynucleotide or polypeptide sequences are identical on a residue-by-residue basis over a particular region of comparison. The term "percentage of sequence identity" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions at which the identical nucleic acid base (*e.g.*, A, T, C, G, U, or I, in the case of nucleic acids) occurs in both sequences to yield the number of matched positions, dividing the number of

matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of sequence identity. The term "substantial identity" as used herein denotes a characteristic of a polynucleotide sequence, wherein the polynucleotide comprises a sequence that has at least 80 percent sequence identity, preferably at least 85 percent identity and often 90 to 95 percent sequence identity, more usually at least 99 percent sequence identity as compared to a reference sequence over a comparison region. The term "percentage of positive residues" is calculated by comparing two optimally aligned sequences over that region of comparison, determining the number of positions at which the identical and conservative amino acid substitutions, as defined above, occur in both sequences to yield the number of matched positions, dividing the number of matched positions by the total number of positions in the region of comparison (*i.e.*, the window size), and multiplying the result by 100 to yield the percentage of positive residues.

Chimeric and fusion proteins

The invention also provides ORX chimeric or fusion proteins. As used herein, an ORX "chimeric protein" or "fusion protein" comprises an ORX polypeptide operatively linked to a non-ORX polypeptide. An "ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to ORX, whereas a "non-ORX polypeptide" refers to a polypeptide having an amino acid sequence corresponding to a protein that is not substantially homologous to the ORX protein, *e.g.*, a protein that is different from the ORX protein and that is derived from the same or a different organism. Within an ORX fusion protein the ORX polypeptide can correspond to all or a portion of an ORX protein. In one embodiment, an ORX fusion protein comprises at least one biologically active portion of an ORX protein. In another embodiment, an ORX fusion protein comprises at least two biologically active portions of an ORX protein. Within the fusion protein, the term "operatively linked" is intended to indicate that the ORX polypeptide and the non-ORX polypeptide are fused in-frame to each other. The non-ORX polypeptide can be fused to the N-terminus or C-terminus of the ORX polypeptide.

For example, in one embodiment an ORX fusion protein comprises an ORX polypeptide operably linked to the extracellular domain of a second protein. Such fusion proteins can be

further utilized in screening assays for compounds that modulate ORX activity (such assays are described in detail below).

In another embodiment, the fusion protein is a GST-ORX fusion protein in which the ORX sequences are fused to the C-terminus of the GST (*i.e.*, glutathione S-transferase) sequences. Such fusion proteins can facilitate the purification of recombinant ORX.

In another embodiment, the fusion protein is an ORX-immunoglobulin fusion protein in which the ORX sequences comprising one or more domains are fused to sequences derived from a member of the immunoglobulin protein family. The ORX-immunoglobulin fusion proteins of the invention can be incorporated into pharmaceutical compositions and administered to a subject to inhibit an interaction between an ORX ligand and an ORX protein on the surface of a cell, to thereby suppress ORX-mediated signal transduction *in vivo*. In one nonlimiting example, a contemplated ORX ligand of the invention is the ORX receptor. The ORX-immunoglobulin fusion proteins can be used to affect the bioavailability of an ORX cognate ligand. Inhibition of the ORX ligand/ORX interaction may be useful therapeutically for both the treatment of proliferative and differentiative disorders, *e.g.*, cancer as well as modulating (*e.g.*, promoting or inhibiting) cell survival. Moreover, the ORX-immunoglobulin fusion proteins of the invention can be used as immunogens to produce anti-ORX antibodies in a subject, to purify ORX ligands, and in screening assays to identify molecules that inhibit the interaction of ORX with an ORX ligand.

An ORX chimeric or fusion protein of the invention can be produced by standard recombinant DNA techniques. For example, DNA fragments coding for the different polypeptide sequences are ligated together in-frame in accordance with conventional techniques, *e.g.*, by employing blunt-ended or stagger-ended termini for ligation, restriction enzyme digestion to provide for appropriate termini, filling-in of cohesive ends as appropriate, alkaline phosphatase treatment to avoid undesirable joining, and enzymatic ligation. In another embodiment, the fusion gene can be synthesized by conventional techniques including automated DNA synthesizers. Alternatively, PCR amplification of gene fragments can be carried out using anchor primers that give rise to complementary overhangs between two consecutive gene fragments that can subsequently be annealed and reamplified to generate a chimeric gene sequence (see, for example, Ausubel et al. (eds.) CURRENT PROTOCOLS IN MOLECULAR BIOLOGY,

John Wiley & Sons, 1992). Moreover, many expression vectors are commercially available that already encode a fusion moiety (*e.g.*, a GST polypeptide). An ORX-encoding nucleic acid can be cloned into such an expression vector such that the fusion moiety is linked in-frame to the ORX protein.

5

ORX agonists and antagonists

The present invention also pertains to variants of the ORX proteins that function as either ORX agonists (mimetics) or as ORX antagonists. Variants of the ORX protein can be generated by mutagenesis, *e.g.*, discrete point mutation or truncation of the ORX protein. An agonist of the ORX protein can retain substantially the same, or a subset of, the biological activities of the naturally occurring form of the ORX protein. An antagonist of the ORX protein can inhibit one or more of the activities of the naturally occurring form of the ORX protein by, for example, competitively binding to a downstream or upstream member of a cellular signaling cascade which includes the ORX protein. Thus, specific biological effects can be elicited by treatment with a variant of limited function. In one embodiment, treatment of a subject with a variant having a subset of the biological activities of the naturally occurring form of the protein has fewer side effects in a subject relative to treatment with the naturally occurring form of the ORX proteins.

Variants of the ORX protein that function as either ORX agonists (mimetics) or as ORX antagonists can be identified by screening combinatorial libraries of mutants, *e.g.*, truncation mutants, of the ORX protein for ORX protein agonist or antagonist activity. In one embodiment, a variegated library of ORX variants is generated by combinatorial mutagenesis at the nucleic acid level and is encoded by a variegated gene library. A variegated library of ORX variants can be produced by, for example, enzymatically ligating a mixture of synthetic oligonucleotides into gene sequences such that a degenerate set of potential ORX sequences is expressible as individual polypeptides, or alternatively, as a set of larger fusion proteins (*e.g.*, for phage display) containing the set of ORX sequences therein. There are a variety of methods which can be used to produce libraries of potential ORX variants from a degenerate oligonucleotide sequence. Chemical synthesis of a degenerate gene sequence can be performed in an automatic DNA synthesizer, and the synthetic gene then ligated into an appropriate expression vector. Use

of a degenerate set of genes allows for the provision, in one mixture, of all of the sequences encoding the desired set of potential ORX sequences. Methods for synthesizing degenerate oligonucleotides are known in the art (see, *e.g.*, Narang (1983) *Tetrahedron* 39:3; Itakura *et al.* (1984) *Annu Rev Biochem* 53:323; Itakura *et al.* (1984) *Science* 198:1056; Ike *et al.* (1983) *Nucl Acid Res* 11:477.

Polypeptide libraries

In addition, libraries of fragments of the ORX protein coding sequence can be used to generate a variegated population of ORX fragments for screening and subsequent selection of variants of an ORX protein. In one embodiment, a library of coding sequence fragments can be generated by treating a double stranded PCR fragment of an ORX coding sequence with a nuclease under conditions wherein nicking occurs only about once per molecule, denaturing the double stranded DNA, renaturing the DNA to form double stranded DNA that can include sense/antisense pairs from different nicked products, removing single stranded portions from reformed duplexes by treatment with S1 nuclease, and ligating the resulting fragment library into an expression vector. By this method, an expression library can be derived which encodes N-terminal and internal fragments of various sizes of the ORX protein.

Several techniques are known in the art for screening gene products of combinatorial libraries made by point mutations or truncation, and for screening cDNA libraries for gene products having a selected property. Such techniques are adaptable for rapid screening of the gene libraries generated by the combinatorial mutagenesis of ORX proteins. The most widely used techniques, which are amenable to high throughput analysis, for screening large gene libraries typically include cloning the gene library into replicable expression vectors, transforming appropriate cells with the resulting library of vectors, and expressing the combinatorial genes under conditions in which detection of a desired activity facilitates isolation of the vector encoding the gene whose product was detected. Recursive ensemble mutagenesis (REM), a new technique that enhances the frequency of functional mutants in the libraries, can be used in combination with the screening assays to identify ORX variants (Arkin and Yourvan (1992) *PNAS* 89:7811-7815; Delgrave *et al.* (1993) *Protein Engineering* 6:327-331).

ORX Antibodies

Also included in the invention are antibodies to ORX proteins, or fragments of ORX proteins. The term "antibody" as used herein refers to immunoglobulin molecules and immunologically active portions of immunoglobulin (Ig) molecules, *i.e.*, molecules that contain an antigen binding site that specifically binds (immunoreacts with) an antigen. Such antibodies include, but are not limited to, polyclonal, monoclonal, chimeric, single chain, F_{ab} , $F_{ab'}$ and $F_{(ab')_2}$ fragments, and an F_{ab} expression library. In general, an antibody molecule obtained from humans relates to any of the classes IgG, IgM, IgA, IgE and IgD, which differ from one another by the nature of the heavy chain present in the molecule. Certain classes have subclasses as well, such as IgG₁, IgG₂, and others. Furthermore, in humans, the light chain may be a kappa chain or a lambda chain. Reference herein to antibodies includes a reference to all such classes, subclasses and types of human antibody species.

An isolated ORX-related protein of the invention may be intended to serve as an antigen, or a portion or fragment thereof, and additionally can be used as an immunogen to generate antibodies that immunospecifically bind the antigen, using standard techniques for polyclonal and monoclonal antibody preparation. The full-length protein can be used or, alternatively, the invention provides antigenic peptide fragments of the antigen for use as immunogens. An antigenic peptide fragment comprises at least 6 amino acid residues of the amino acid sequence of the full length protein and encompasses an epitope thereof such that an antibody raised against the peptide forms a specific immune complex with the full length protein or with any fragment that contains the epitope. Preferably, the antigenic peptide comprises at least 10 amino acid residues, or at least 15 amino acid residues, or at least 20 amino acid residues, or at least 30 amino acid residues. Preferred epitopes encompassed by the antigenic peptide are regions of the protein that are located on its surface; commonly these are hydrophilic regions.

In certain embodiments of the invention, at least one epitope encompassed by the antigenic peptide is a region of ORX-related protein that is located on the surface of the protein, *e.g.*, a hydrophilic region. A hydrophobicity analysis of the human ORX-related protein sequence will indicate which regions of an ORX-related protein are particularly hydrophilic and, therefore, are likely to encode surface residues useful for targeting antibody production. As a means for targeting antibody production, hydropathy plots showing regions of hydrophilicity and

hydrophobicity may be generated by any method well known in the art, including, for example, the Kyte Doolittle or the Hopp Woods methods, either with or without Fourier transformation. See, *e.g.*, Hopp and Woods, 1981, *Proc. Nat. Acad. Sci. USA* 78: 3824-3828; Kyte and Doolittle 1982, *J. Mol. Biol.* 157: 105-142, each of which is incorporated herein by reference in its entirety. Antibodies that are specific for one or more domains within an antigenic protein, or derivatives, fragments, analogs or homologs thereof, are also provided herein.

A protein of the invention, or a derivative, fragment, analog, homolog or ortholog thereof, may be utilized as an immunogen in the generation of antibodies that immunospecifically bind these protein components.

Various procedures known within the art may be used for the production of polyclonal or monoclonal antibodies directed against a protein of the invention, or against derivatives, fragments, analogs homologs or orthologs thereof (see, for example, *Antibodies: A Laboratory Manual*, Harlow E, and Lane D, 1988, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, incorporated herein by reference). Some of these antibodies are discussed below.

Polyclonal Antibodies

For the production of polyclonal antibodies, various suitable host animals (*e.g.*, rabbit, goat, mouse or other mammal) may be immunized by one or more injections with the native protein, a synthetic variant thereof, or a derivative of the foregoing. An appropriate immunogenic preparation can contain, for example, the naturally occurring immunogenic protein, a chemically synthesized polypeptide representing the immunogenic protein, or a recombinantly expressed immunogenic protein. Furthermore, the protein may be conjugated to a second protein known to be immunogenic in the mammal being immunized. Examples of such immunogenic proteins include but are not limited to keyhole limpet hemocyanin, serum albumin, bovine thyroglobulin, and soybean trypsin inhibitor. The preparation can further include an adjuvant. Various adjuvants used to increase the immunological response include, but are not limited to, Freund's (complete and incomplete), mineral gels (*e.g.*, aluminum hydroxide), surface active substances (*e.g.*, lysolecithin, pluronic polyols, polyanions, peptides, oil emulsions, dinitrophenol, etc.), adjuvants usable in humans such as Bacille Calmette-Guerin and *Corynebacterium parvum*, or similar immunostimulatory agents. Additional examples of

adjuvants which can be employed include MPL-TDM adjuvant (monophosphoryl Lipid A, synthetic trehalose dicorynomycolate).

The polyclonal antibody molecules directed against the immunogenic protein can be isolated from the mammal (*e.g.*, from the blood) and further purified by well known techniques, such as affinity chromatography using protein A or protein G, which provide primarily the IgG fraction of immune serum. Subsequently, or alternatively, the specific antigen which is the target of the immunoglobulin sought, or an epitope thereof, may be immobilized on a column to purify the immune specific antibody by immunoaffinity chromatography. Purification of immunoglobulins is discussed, for example, by D. Wilkinson (*The Scientist*, published by The Scientist, Inc., Philadelphia PA, Vol. 14, No. 8 (April 17, 2000), pp. 25-28).

Monoclonal Antibodies

The term "monoclonal antibody" (MAb) or "monoclonal antibody composition", as used herein, refers to a population of antibody molecules that contain only one molecular species of antibody molecule consisting of a unique light chain gene product and a unique heavy chain gene product. In particular, the complementarity determining regions (CDRs) of the monoclonal antibody are identical in all the molecules of the population. MAbs thus contain an antigen binding site capable of immunoreacting with a particular epitope of the antigen characterized by a unique binding affinity for it.

Monoclonal antibodies can be prepared using hybridoma methods, such as those described by Kohler and Milstein, *Nature*, 256:495 (1975). In a hybridoma method, a mouse, hamster, or other appropriate host animal, is typically immunized with an immunizing agent to elicit lymphocytes that produce or are capable of producing antibodies that will specifically bind to the immunizing agent. Alternatively, the lymphocytes can be immunized *in vitro*.

The immunizing agent will typically include the protein antigen, a fragment thereof or a fusion protein thereof. Generally, either peripheral blood lymphocytes are used if cells of human origin are desired, or spleen cells or lymph node cells are used if non-human mammalian sources are desired. The lymphocytes are then fused with an immortalized cell line using a suitable fusing agent, such as polyethylene glycol, to form a hybridoma cell (Goding, *Monoclonal Antibodies: Principles and Practice*, Academic Press, (1986) pp. 59-103). Immortalized cell lines

are usually transformed mammalian cells, particularly myeloma cells of rodent, bovine and human origin. Usually, rat or mouse myeloma cell lines are employed. The hybridoma cells can be cultured in a suitable culture medium that preferably contains one or more substances that inhibit the growth or survival of the unfused, immortalized cells. For example, if the parental cells lack the enzyme hypoxanthine guanine phosphoribosyl transferase (HGPRT or HPRT), the culture medium for the hybridomas typically will include hypoxanthine, aminopterin, and thymidine ("HAT medium"), which substances prevent the growth of HGPRT-deficient cells.

Preferred immortalized cell lines are those that fuse efficiently, support stable high level expression of antibody by the selected antibody-producing cells, and are sensitive to a medium such as HAT medium. More preferred immortalized cell lines are murine myeloma lines, which can be obtained, for instance, from the Salk Institute Cell Distribution Center, San Diego, California and the American Type Culture Collection, Manassas, Virginia. Human myeloma and mouse-human heteromyeloma cell lines also have been described for the production of human monoclonal antibodies (Kozbor, J. Immunol., 133:3001 (1984); Brodeur et al., Monoclonal Antibody Production Techniques and Applications, Marcel Dekker, Inc., New York, (1987) pp. 51-63).

The culture medium in which the hybridoma cells are cultured can then be assayed for the presence of monoclonal antibodies directed against the antigen. Preferably, the binding specificity of monoclonal antibodies produced by the hybridoma cells is determined by immunoprecipitation or by an *in vitro* binding assay, such as radioimmunoassay (RIA) or enzyme-linked immunoabsorbent assay (ELISA). Such techniques and assays are known in the art. The binding affinity of the monoclonal antibody can, for example, be determined by the Scatchard analysis of Munson and Pollard, Anal. Biochem., 107:220 (1980). Preferably, antibodies having a high degree of specificity and a high binding affinity for the target antigen are isolated.

After the desired hybridoma cells are identified, the clones can be subcloned by limiting dilution procedures and grown by standard methods. Suitable culture media for this purpose include, for example, Dulbecco's Modified Eagle's Medium and RPMI-1640 medium. Alternatively, the hybridoma cells can be grown *in vivo* as ascites in a mammal.

The monoclonal antibodies secreted by the subclones can be isolated or purified from the culture medium or ascites fluid by conventional immunoglobulin purification procedures such as, for example, protein A-Sepharose, hydroxylapatite chromatography, gel electrophoresis, dialysis, or affinity chromatography.

5 The monoclonal antibodies can also be made by recombinant DNA methods, such as those described in U.S. Patent No. 4,816,567. DNA encoding the monoclonal antibodies of the invention can be readily isolated and sequenced using conventional procedures (*e.g.*, by using oligonucleotide probes that are capable of binding specifically to genes encoding the heavy and light chains of murine antibodies). The hybridoma cells of the invention serve as a preferred
10 source of such DNA. Once isolated, the DNA can be placed into expression vectors, which are then transfected into host cells such as simian COS cells, Chinese hamster ovary (CHO) cells, or myeloma cells that do not otherwise produce immunoglobulin protein, to obtain the synthesis of monoclonal antibodies in the recombinant host cells. The DNA also can be modified, for example, by substituting the coding sequence for human heavy and light chain constant domains in place of the homologous murine sequences (U.S. Patent No. 4,816,567; Morrison, Nature 368,
15 812-13 (1994)) or by covalently joining to the immunoglobulin coding sequence all or part of the coding sequence for a non-immunoglobulin polypeptide. Such a non-immunoglobulin polypeptide can be substituted for the constant domains of an antibody of the invention, or can be substituted for the variable domains of one antigen-combining site of an antibody of the
20 invention to create a chimeric bivalent antibody.

Humanized Antibodies

The antibodies directed against the protein antigens of the invention can further comprise humanized antibodies or human antibodies. These antibodies are suitable for administration to
25 humans without engendering an immune response by the human against the administered immunoglobulin. Humanized forms of antibodies are chimeric immunoglobulins, immunoglobulin chains or fragments thereof (such as Fv, Fab, Fab', F(ab')₂ or other antigen-binding subsequences of antibodies) that are principally comprised of the sequence of a human immunoglobulin, and contain minimal sequence derived from a non-human immunoglobulin.
30 Humanization can be performed following the method of Winter and co-workers (Jones et al.,

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Nature, 321:522-525 (1986); Riechmann et al., Nature, 332:323-327 (1988); Verhoeven et al.,
Science, 239:1534-1536 (1988)), by substituting rodent CDRs or CDR sequences for the
corresponding sequences of a human antibody. (See also U.S. Patent No. 5,225,539.) In some
instances, Fv framework residues of the human immunoglobulin are replaced by corresponding
non-human residues. Humanized antibodies can also comprise residues which are found neither
in the recipient antibody nor in the imported CDR or framework sequences. In general, the
humanized antibody will comprise substantially all of at least one, and typically two, variable
domains, in which all or substantially all of the CDR regions correspond to those of a non-human
immunoglobulin and all or substantially all of the framework regions are those of a human
immunoglobulin consensus sequence. The humanized antibody optimally also will comprise at
least a portion of an immunoglobulin constant region (Fc), typically that of a human
immunoglobulin (Jones et al., 1986; Riechmann et al., 1988; and Presta, Curr. Op. Struct. Biol.,
2:593-596 (1992)).

Human Antibodies

Fully human antibodies relate to antibody molecules in which essentially the entire
sequences of both the light chain and the heavy chain, including the CDRs, arise from human
genes. Such antibodies are termed "human antibodies", or "fully human antibodies" herein.
Human monoclonal antibodies can be prepared by the trioma technique; the human B-cell
hybridoma technique (see Kozbor, et al., 1983 Immunol Today 4: 72) and the EBV hybridoma
technique to produce human monoclonal antibodies (see Cole, et al., 1985 In: MONOCLONAL
ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96). Human monoclonal
antibodies may be utilized in the practice of the present invention and may be produced by using
human hybridomas (see Cote, et al., 1983. Proc Natl Acad Sci USA 80: 2026-2030) or by
transforming human B-cells with Epstein Barr Virus *in vitro* (see Cole, et al., 1985 In:
MONOCLONAL ANTIBODIES AND CANCER THERAPY, Alan R. Liss, Inc., pp. 77-96).

In addition, human antibodies can also be produced using additional techniques,
including phage display libraries (Hoogenboom and Winter, J. Mol. Biol., 227:381 (1991);
Marks et al., J. Mol. Biol., 222:581 (1991)). Similarly, human antibodies can be made by
introducing human immunoglobulin loci into transgenic animals, *e.g.*, mice in which the

endogenous immunoglobulin genes have been partially or completely inactivated. Upon challenge, human antibody production is observed, which closely resembles that seen in humans in all respects, including gene rearrangement, assembly, and antibody repertoire. This approach is described, for example, in U.S. Patent Nos. 5,545,807; 5,545,806; 5,569,825; 5,625,126; 5,633,425; 5,661,016, and in Marks et al. (Bio/Technology 10, 779-783 (1992)); Lonberg et al. (Nature 368 856-859 (1994)); Morrison (Nature 368, 812-13 (1994)); Fishwild et al,(Nature Biotechnology 14, 845-51 (1996)); Neuberger (Nature Biotechnology 14, 826 (1996)); and Lonberg and Huszar (Intern. Rev. Immunol. 13 65-93 (1995)).

Human antibodies may additionally be produced using transgenic nonhuman animals which are modified so as to produce fully human antibodies rather than the animal's endogenous antibodies in response to challenge by an antigen. (See PCT publication WO94/02602). The endogenous genes encoding the heavy and light immunoglobulin chains in the nonhuman host have been incapacitated, and active loci encoding human heavy and light chain immunoglobulins are inserted into the host's genome. The human genes are incorporated, for example, using yeast artificial chromosomes containing the requisite human DNA segments. An animal which provides all the desired modifications is then obtained as progeny by crossbreeding intermediate transgenic animals containing fewer than the full complement of the modifications. The preferred embodiment of such a nonhuman animal is a mouse, and is termed the Xenomouse™ as disclosed in PCT publications WO 96/33735 and WO 96/34096. This animal produces B cells which secrete fully human immunoglobulins. The antibodies can be obtained directly from the animal after immunization with an immunogen of interest, as, for example, a preparation of a polyclonal antibody, or alternatively from immortalized B cells derived from the animal, such as hybridomas producing monoclonal antibodies. Additionally, the genes encoding the immunoglobulins with human variable regions can be recovered and expressed to obtain the antibodies directly, or can be further modified to obtain analogs of antibodies such as, for example, single chain Fv molecules.

An example of a method of producing a nonhuman host, exemplified as a mouse, lacking expression of an endogenous immunoglobulin heavy chain is disclosed in U.S. Patent No. 5,939,598. It can be obtained by a method including deleting the J segment genes from at least one endogenous heavy chain locus in an embryonic stem cell to prevent rearrangement of the

locus and to prevent formation of a transcript of a rearranged immunoglobulin heavy chain locus, the deletion being effected by a targeting vector containing a gene encoding a selectable marker; and producing from the embryonic stem cell a transgenic mouse whose somatic and germ cells contain the gene encoding the selectable marker.

5 A method for producing an antibody of interest, such as a human antibody, is disclosed in U.S. Patent No. 5,916,771. It includes introducing an expression vector that contains a nucleotide sequence encoding a heavy chain into one mammalian host cell in culture, introducing an expression vector containing a nucleotide sequence encoding a light chain into another mammalian host cell, and fusing the two cells to form a hybrid cell. The hybrid cell expresses an
10 antibody containing the heavy chain and the light chain.

In a further improvement on this procedure, a method for identifying a clinically relevant epitope on an immunogen, and a correlative method for selecting an antibody that binds immunospecifically to the relevant epitope with high affinity, are disclosed in PCT publication WO 99/53049.

15 **F_{ab} Fragments and Single Chain Antibodies**

According to the invention, techniques can be adapted for the production of single-chain antibodies specific to an antigenic protein of the invention (see *e.g.*, U.S. Patent No. 4,946,778). In addition, methods can be adapted for the construction of F_{ab} expression libraries (see *e.g.*,
20 Huse, et al., 1989 Science 246: 1275-1281) to allow rapid and effective identification of monoclonal F_{ab} fragments with the desired specificity for a protein or derivatives, fragments, analogs or homologs thereof. Antibody fragments that contain the idiotypes to a protein antigen may be produced by techniques known in the art including, but not limited to: (i) an F_{(ab')₂} fragment produced by pepsin digestion of an antibody molecule; (ii) an F_{ab} fragment generated
25 by reducing the disulfide bridges of an F_{(ab')₂} fragment; (iii) an F_{ab} fragment generated by the treatment of the antibody molecule with papain and a reducing agent and (iv) F_v fragments.

Bispecific Antibodies

Bispecific antibodies are monoclonal, preferably human or humanized, antibodies that
30 have binding specificities for at least two different antigens. In the present case, one of the

binding specificities is for an antigenic protein of the invention. The second binding target is any other antigen, and advantageously is a cell-surface protein or receptor or receptor subunit.

Methods for making bispecific antibodies are known in the art. Traditionally, the recombinant production of bispecific antibodies is based on the co-expression of two immunoglobulin heavy-chain/light-chain pairs, where the two heavy chains have different specificities (Milstein and Cuello, Nature, 305:537-539 (1983)). Because of the random assortment of immunoglobulin heavy and light chains, these hybridomas (quadromas) produce a potential mixture of ten different antibody molecules, of which only one has the correct bispecific structure. The purification of the correct molecule is usually accomplished by affinity chromatography steps. Similar procedures are disclosed in WO 93/08829, published 13 May 1993, and in Traunecker *et al.*, 1991 *EMBO J.*, 10:3655-3659.

Antibody variable domains with the desired binding specificities (antibody-antigen combining sites) can be fused to immunoglobulin constant domain sequences. The fusion preferably is with an immunoglobulin heavy-chain constant domain, comprising at least part of the hinge, CH2, and CH3 regions. It is preferred to have the first heavy-chain constant region (CH1) containing the site necessary for light-chain binding present in at least one of the fusions. DNAs encoding the immunoglobulin heavy-chain fusions and, if desired, the immunoglobulin light chain, are inserted into separate expression vectors, and are co-transfected into a suitable host organism. For further details of generating bispecific antibodies see, for example, Suresh *et al.*, Methods in Enzymology, 121:210 (1986).

According to another approach described in WO 96/27011, the interface between a pair of antibody molecules can be engineered to maximize the percentage of heterodimers which are recovered from recombinant cell culture. The preferred interface comprises at least a part of the CH3 region of an antibody constant domain. In this method, one or more small amino acid side chains from the interface of the first antibody molecule are replaced with larger side chains (*e.g.* tyrosine or tryptophan). Compensatory "cavities" of identical or similar size to the large side chain(s) are created on the interface of the second antibody molecule by replacing large amino acid side chains with smaller ones (*e.g.* alanine or threonine). This provides a mechanism for increasing the yield of the heterodimer over other unwanted end-products such as homodimers.

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Bispecific antibodies can be prepared as full length antibodies or antibody fragments (*e.g.* $F(ab')_2$ bispecific antibodies). Techniques for generating bispecific antibodies from antibody fragments have been described in the literature. For example, bispecific antibodies can be prepared using chemical linkage. Brennan et al., Science 229:81 (1985) describe a procedure wherein intact antibodies are proteolytically cleaved to generate $F(ab')_2$ fragments. These fragments are reduced in the presence of the dithiol complexing agent sodium arsenite to stabilize vicinal dithiols and prevent intermolecular disulfide formation. The Fab' fragments generated are then converted to thionitrobenzoate (TNB) derivatives. One of the Fab'-TNB derivatives is then reconverted to the Fab'-thiol by reduction with mercaptoethylamine and is mixed with an equimolar amount of the other Fab'-TNB derivative to form the bispecific antibody. The bispecific antibodies produced can be used as agents for the selective immobilization of enzymes.

Additionally, Fab' fragments can be directly recovered from *E. coli* and chemically coupled to form bispecific antibodies. Shalaby et al., J. Exp. Med. 175:217-225 (1992) describe the production of a fully humanized bispecific antibody $F(ab')_2$ molecule. Each Fab' fragment was separately secreted from *E. coli* and subjected to directed chemical coupling *in vitro* to form the bispecific antibody. The bispecific antibody thus formed was able to bind to cells overexpressing the ErbB2 receptor and normal human T cells, as well as trigger the lytic activity of human cytotoxic lymphocytes against human breast tumor targets.

Various techniques for making and isolating bispecific antibody fragments directly from recombinant cell culture have also been described. For example, bispecific antibodies have been produced using leucine zippers. Kostelny et al., J. Immunol. 148(5):1547-1553 (1992). The leucine zipper peptides from the Fos and Jun proteins were linked to the Fab' portions of two different antibodies by gene fusion. The antibody homodimers were reduced at the hinge region to form monomers and then re-oxidized to form the antibody heterodimers. This method can also be utilized for the production of antibody homodimers. The "diabody" technology described by Hollinger et al., Proc. Natl. Acad. Sci. USA 90:6444-6448 (1993) has provided an alternative mechanism for making bispecific antibody fragments. The fragments comprise a heavy-chain variable domain (V_H) connected to a light-chain variable domain (V_L) by a linker which is too short to allow pairing between the two domains on the same chain. Accordingly, the V_H and V_L

domains of one fragment are forced to pair with the complementary V_L and V_H domains of another fragment, thereby forming two antigen-binding sites. Another strategy for making bispecific antibody fragments by the use of single-chain Fv (sFv) dimers has also been reported. See, Gruber et al., J. Immunol. 152:5368 (1994).

5 Antibodies with more than two valencies are contemplated. For example, trispecific antibodies can be prepared. Tutt et al., J. Immunol. 147:60 (1991).

Exemplary bispecific antibodies can bind to two different epitopes, at least one of which originates in the protein antigen of the invention. Alternatively, an anti-antigenic arm of an immunoglobulin molecule can be combined with an arm which binds to a triggering molecule on a leukocyte such as a T-cell receptor molecule (*e.g.* CD2, CD3, CD28, or B7), or Fc receptors for IgG (Fc R), such as Fc RI (CD64), Fc RII (CD32) and Fc RIII (CD16) so as to focus cellular defense mechanisms to the cell expressing the particular antigen. Bispecific antibodies can also be used to direct cytotoxic agents to cells which express a particular antigen. These antibodies possess an antigen-binding arm and an arm which binds a cytotoxic agent or a radionuclide chelator, such as EOTUBE, DPTA, DOTA, or TETA. Another bispecific antibody of interest binds the protein antigen described herein and further binds tissue factor (TF).

Heteroconjugate Antibodies

Heteroconjugate antibodies are also within the scope of the present invention.

20 Heteroconjugate antibodies are composed of two covalently joined antibodies. Such antibodies have, for example, been proposed to target immune system cells to unwanted cells (U.S. Patent No. 4,676,980), and for treatment of HIV infection (WO 91/00360; WO 92/200373; EP 03089). It is contemplated that the antibodies can be prepared *in vitro* using known methods in synthetic protein chemistry, including those involving crosslinking agents. For example, immunotoxins

25 can be constructed using a disulfide exchange reaction or by forming a thioether bond. Examples of suitable reagents for this purpose include iminothiolate and methyl-4-mercaptobutyrimidate and those disclosed, for example, in U.S. Patent No. 4,676,980.

Effector Function Engineering

It can be desirable to modify the antibody of the invention with respect to effector function, so as to enhance, *e.g.*, the effectiveness of the antibody in treating cancer. For example, cysteine residue(s) can be introduced into the Fc region, thereby allowing interchain disulfide bond formation in this region. The homodimeric antibody thus generated can have improved internalization capability and/or increased complement-mediated cell killing and antibody-dependent cellular cytotoxicity (ADCC). See Caron et al., J. Exp Med., 176: 1191-1195 (1992) and Shopes, J. Immunol., 148: 2918-2922 (1992). Homodimeric antibodies with enhanced anti-tumor activity can also be prepared using heterobifunctional cross-linkers as described in Wolff et al. Cancer Research, 53: 2560-2565 (1993). Alternatively, an antibody can be engineered that has dual Fc regions and can thereby have enhanced complement lysis and ADCC capabilities. See Stevenson et al., Anti-Cancer Drug Design, 3: 219-230 (1989).

Immunoconjugates

The invention also pertains to immunoconjugates comprising an antibody conjugated to a cytotoxic agent such as a chemotherapeutic agent, toxin (*e.g.*, an enzymatically active toxin of bacterial, fungal, plant, or animal origin, or fragments thereof), or a radioactive isotope (*i.e.*, a radioconjugate).

Chemotherapeutic agents useful in the generation of such immunoconjugates have been described above. Enzymatically active toxins and fragments thereof that can be used include diphtheria A chain, nonbinding active fragments of diphtheria toxin, exotoxin A chain (from *Pseudomonas aeruginosa*), ricin A chain, abrin A chain, modeccin A chain, alpha-sarcin, Aleurites fordii proteins, dianthin proteins, Phytolaca americana proteins (PAPI, PAPII, and PAP-S), momordica charantia inhibitor, curcin, crotin, sapaonaria officinalis inhibitor, gelonin, mitogellin, restrictocin, phenomycin, enomycin, and the tricothecenes. A variety of radionuclides are available for the production of radioconjugated antibodies. Examples include ^{212}Bi , ^{131}I , ^{131}In , ^{90}Y , and ^{186}Re .

Conjugates of the antibody and cytotoxic agent are made using a variety of bifunctional protein-coupling agents such as N-succinimidyl-3-(2-pyridyldithiol) propionate (SPDP), iminothiolane (IT), bifunctional derivatives of imidoesters (such as dimethyl adipimidate HCL),

active esters (such as disuccinimidyl suberate), aldehydes (such as glutarelddehyde), bis-azido compounds (such as bis (p-azidobenzoyl) hexanediamine), bis-diazonium derivatives (such as bis-(p-diazoniumbenzoyl)-ethylenediamine), diisocyanates (such as tolyene 2,6-diisocyanate), and bis-active fluorine compounds (such as 1,5-difluoro-2,4-dinitrobenzene). For example, a ricin immunotoxin can be prepared as described in Vitetta et al., Science, 238: 1098 (1987). Carbon-14-labeled 1-isothiocyanatobenzyl-3-methyldiethylene triaminepentaacetic acid (MX-DTPA) is an exemplary chelating agent for conjugation of radionucleotide to the antibody. See WO94/11026.

In another embodiment, the antibody can be conjugated to a "receptor" (such streptavidin) for utilization in tumor pretargeting wherein the antibody-receptor conjugate is administered to the patient, followed by removal of unbound conjugate from the circulation using a clearing agent and then administration of a "ligand" (e.g., avidin) that is in turn conjugated to a cytotoxic agent.

ORX Recombinant Expression Vectors and Host Cells

Another aspect of the invention pertains to vectors, preferably expression vectors, containing a nucleic acid encoding an ORX protein, or derivatives, fragments, analogs or homologs thereof. As used herein, the term "vector" refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked. One type of vector is a "plasmid", which refers to a circular double stranded DNA loop into which additional DNA segments can be ligated. Another type of vector is a viral vector, wherein additional DNA segments can be ligated into the viral genome. Certain vectors are capable of autonomous replication in a host cell into which they are introduced (e.g., bacterial vectors having a bacterial origin of replication and episomal mammalian vectors). Other vectors (e.g., non-episomal mammalian vectors) are integrated into the genome of a host cell upon introduction into the host cell, and thereby are replicated along with the host genome. Moreover, certain vectors are capable of directing the expression of genes to which they are operatively-linked. Such vectors are referred to herein as "expression vectors". In general, expression vectors of utility in recombinant DNA techniques are often in the form of plasmids. In the present specification, "plasmid" and "vector" can be used interchangeably as the plasmid is the most commonly used form of vector. However, the

invention is intended to include such other forms of expression vectors, such as viral vectors (e.g., replication defective retroviruses, adenoviruses and adeno-associated viruses), which serve equivalent functions.

The recombinant expression vectors of the invention comprise a nucleic acid of the invention in a form suitable for expression of the nucleic acid in a host cell, which means that the recombinant expression vectors include one or more regulatory sequences, selected on the basis of the host cells to be used for expression, that is operatively-linked to the nucleic acid sequence to be expressed. Within a recombinant expression vector, "operably-linked" is intended to mean that the nucleotide sequence of interest is linked to the regulatory sequence(s) in a manner that allows for expression of the nucleotide sequence (e.g., in an *in vitro* transcription/translation system or in a host cell when the vector is introduced into the host cell).

The term "regulatory sequence" is intended to include promoters, enhancers and other expression control elements (e.g., polyadenylation signals). Such regulatory sequences are described, for example, in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Regulatory sequences include those that direct constitutive expression of a nucleotide sequence in many types of host cell and those that direct expression of the nucleotide sequence only in certain host cells (e.g., tissue-specific regulatory sequences). It will be appreciated by those skilled in the art that the design of the expression vector can depend on such factors as the choice of the host cell to be transformed, the level of expression of protein desired, etc. The expression vectors of the invention can be introduced into host cells to thereby produce proteins or peptides, including fusion proteins or peptides, encoded by nucleic acids as described herein (e.g., ORX proteins, mutant forms of ORX proteins, fusion proteins, etc.).

The recombinant expression vectors of the invention can be designed for expression of ORX proteins in prokaryotic or eukaryotic cells. For example, ORX proteins can be expressed in bacterial cells such as *Escherichia coli*, insect cells (using baculovirus expression vectors) yeast cells or mammalian cells. Suitable host cells are discussed further in Goeddel, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990). Alternatively, the recombinant expression vector can be transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

Expression of proteins in prokaryotes is most often carried out in *Escherichia coli* with vectors containing constitutive or inducible promoters directing the expression of either fusion or non-fusion proteins. Fusion vectors add a number of amino acids to a protein encoded therein, usually to the amino terminus of the recombinant protein. Such fusion vectors typically serve three purposes: (i) to increase expression of recombinant protein; (ii) to increase the solubility of the recombinant protein; and (iii) to aid in the purification of the recombinant protein by acting as a ligand in affinity purification. Often, in fusion expression vectors, a proteolytic cleavage site is introduced at the junction of the fusion moiety and the recombinant protein to enable separation of the recombinant protein from the fusion moiety subsequent to purification of the fusion protein. Such enzymes, and their cognate recognition sequences, include Factor Xa, thrombin and enterokinase. Typical fusion expression vectors include pGEX (Pharmacia Biotech Inc; Smith and Johnson, 1988. *Gene* 67: 31-40), pMAL (New England Biolabs, Beverly, Mass.) and pRIT5 (Pharmacia, Piscataway, N.J.) that fuse glutathione S-transferase (GST), maltose E binding protein, or protein A, respectively, to the target recombinant protein.

Examples of suitable inducible non-fusion *E. coli* expression vectors include pTrc (Amrann *et al.*, (1988) *Gene* 69:301-315) and pET 11d (Studier *et al.*, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 60-89).

One strategy to maximize recombinant protein expression in *E. coli* is to express the protein in a host bacteria with an impaired capacity to proteolytically cleave the recombinant protein. See, e.g., Gottesman, GENE EXPRESSION TECHNOLOGY: METHODS IN ENZYMOLOGY 185, Academic Press, San Diego, Calif. (1990) 119-128. Another strategy is to alter the nucleic acid sequence of the nucleic acid to be inserted into an expression vector so that the individual codons for each amino acid are those preferentially utilized in *E. coli* (see, e.g., Wada, *et al.*, 1992. *Nucl. Acids Res.* 20: 2111-2118). Such alteration of nucleic acid sequences of the invention can be carried out by standard DNA synthesis techniques.

In another embodiment, the ORX expression vector is a yeast expression vector. Examples of vectors for expression in yeast *Saccharomyces cerevisiae* include pYepSec1 (Baldari, *et al.*, 1987. *EMBO J.* 6: 229-234), pMFa (Kurjan and Herskowitz, 1982. *Cell* 30:

933-943), pJRY88 (Schultz *et al.*, 1987. *Gene* 54: 113-123), pYES2 (Invitrogen Corporation, San Diego, Calif.), and picZ (InVitrogen Corp, San Diego, Calif.).

Alternatively, ORX can be expressed in insect cells using baculovirus expression vectors. Baculovirus vectors available for expression of proteins in cultured insect cells (*e.g.*, SF9 cells) include the pAc series (Smith, *et al.*, 1983. *Mol. Cell. Biol.* 3: 2156-2165) and the pVL series (Lucklow and Summers, 1989. *Virology* 170: 31-39).

In yet another embodiment, a nucleic acid of the invention is expressed in mammalian cells using a mammalian expression vector. Examples of mammalian expression vectors include pCDM8 (Seed, 1987. *Nature* 329: 840) and pMT2PC (Kaufman, *et al.*, 1987. *EMBO J.* 6: 187-195). When used in mammalian cells, the expression vector's control functions are often provided by viral regulatory elements. For example, commonly used promoters are derived from polyoma, adenovirus 2, cytomegalovirus, and simian virus 40. For other suitable expression systems for both prokaryotic and eukaryotic cells see, *e.g.*, Chapters 16 and 17 of Sambrook, *et al.*, MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989.

In another embodiment, the recombinant mammalian expression vector is capable of directing expression of the nucleic acid preferentially in a particular cell type (*e.g.*, tissue-specific regulatory elements are used to express the nucleic acid). Tissue-specific regulatory elements are known in the art. Non-limiting examples of suitable tissue-specific promoters include the albumin promoter (liver-specific; Pinkert, *et al.*, 1987. *Genes Dev.* 1: 268-277), lymphoid-specific promoters (Calame and Eaton, 1988. *Adv. Immunol.* 43: 235-275), in particular promoters of T cell receptors (Winoto and Baltimore, 1989. *EMBO J.* 8: 729-733) and immunoglobulins (Banerji, *et al.*, 1983. *Cell* 33: 729-740; Queen and Baltimore, 1983. *Cell* 33: 741-748), neuron-specific promoters (*e.g.*, the neurofilament promoter; Byrne and Ruddle, 1989. *Proc. Natl. Acad. Sci. USA* 86: 5473-5477), pancreas-specific promoters (Edlund, *et al.*, 1985. *Science* 230: 912-916), and mammary gland-specific promoters (*e.g.*, milk whey promoter; U.S. Pat. No. 4,873,316 and European Application Publication No. 264,166). Developmentally-regulated promoters are also encompassed, *e.g.*, the murine hox promoters (Kessel and Gruss, 1990. *Science* 249: 374-379) and the α -fetoprotein promoter (Campes and Tilghman, 1989. *Genes Dev.* 3: 537-546).

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The invention further provides a recombinant expression vector comprising a DNA molecule of the invention cloned into the expression vector in an antisense orientation. That is, the DNA molecule is operatively-linked to a regulatory sequence in a manner that allows for expression (by transcription of the DNA molecule) of an RNA molecule that is antisense to ORX mRNA. Regulatory sequences operatively linked to a nucleic acid cloned in the antisense orientation can be chosen that direct the continuous expression of the antisense RNA molecule in a variety of cell types, for instance viral promoters and/or enhancers, or regulatory sequences can be chosen that direct constitutive, tissue specific or cell type specific expression of antisense RNA. The antisense expression vector can be in the form of a recombinant plasmid, phagemid or attenuated virus in which antisense nucleic acids are produced under the control of a high efficiency regulatory region, the activity of which can be determined by the cell type into which the vector is introduced. For a discussion of the regulation of gene expression using antisense genes *see, e.g.,* Weintraub, *et al.*, "Antisense RNA as a molecular tool for genetic analysis," *Reviews-Trends in Genetics*, Vol. 1(1) 1986.

Another aspect of the invention pertains to host cells into which a recombinant expression vector of the invention has been introduced. The terms "host cell" and "recombinant host cell" are used interchangeably herein. It is understood that such terms refer not only to the particular subject cell but also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein.

A host cell can be any prokaryotic or eukaryotic cell. For example, ORX protein can be expressed in bacterial cells such as *E. coli*, insect cells, yeast or mammalian cells (such as human, Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

Vector DNA can be introduced into prokaryotic or eukaryotic cells via conventional transformation or transfection techniques. As used herein, the terms "transformation" and "transfection" are intended to refer to a variety of art-recognized techniques for introducing foreign nucleic acid (*e.g.*, DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, DEAE-dextran-mediated transfection, lipofection, or electroporation.

Suitable methods for transforming or transfecting host cells can be found in Sambrook, *et al.* (MOLECULAR CLONING: A LABORATORY MANUAL. 2nd ed., Cold Spring Harbor Laboratory, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y., 1989), and other laboratory manuals.

For stable transfection of mammalian cells, it is known that, depending upon the expression vector and transfection technique used, only a small fraction of cells may integrate the foreign DNA into their genome. In order to identify and select these integrants, a gene that encodes a selectable marker (*e.g.*, resistance to antibiotics) is generally introduced into the host cells along with the gene of interest. Various selectable markers include those that confer resistance to drugs, such as G418, hygromycin and methotrexate. Nucleic acid encoding a selectable marker can be introduced into a host cell on the same vector as that encoding ORX or can be introduced on a separate vector. Cells stably transfected with the introduced nucleic acid can be identified by drug selection (*e.g.*, cells that have incorporated the selectable marker gene will survive, while the other cells die).

A host cell of the invention, such as a prokaryotic or eukaryotic host cell in culture, can be used to produce (*i.e.*, express) ORX protein. Accordingly, the invention further provides methods for producing ORX protein using the host cells of the invention. In one embodiment, the method comprises culturing the host cell of invention (into which a recombinant expression vector encoding ORX protein has been introduced) in a suitable medium such that ORX protein is produced. In another embodiment, the method further comprises isolating ORX protein from the medium or the host cell.

Transgenic ORX Animals

The host cells of the invention can also be used to produce non-human transgenic animals. For example, in one embodiment, a host cell of the invention is a fertilized oocyte or an embryonic stem cell into which ORX protein-coding sequences have been introduced. Such host cells can then be used to create non-human transgenic animals in which exogenous ORX sequences have been introduced into their genome or homologous recombinant animals in which endogenous ORX sequences have been altered. Such animals are useful for studying the function and/or activity of ORX protein and for identifying and/or evaluating modulators of

ORX protein activity. As used herein, a "transgenic animal" is a non-human animal, preferably a mammal, more preferably a rodent such as a rat or mouse, in which one or more of the cells of the animal includes a transgene. Other examples of transgenic animals include non-human primates, sheep, dogs, cows, goats, chickens, amphibians, etc. A transgene is exogenous DNA that is integrated into the genome of a cell from which a transgenic animal develops and that remains in the genome of the mature animal, thereby directing the expression of an encoded gene product in one or more cell types or tissues of the transgenic animal. As used herein, a "homologous recombinant animal" is a non-human animal, preferably a mammal, more preferably a mouse, in which an endogenous ORX gene has been altered by homologous recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal, *e.g.*, an embryonic cell of the animal, prior to development of the animal.

A transgenic animal of the invention can be created by introducing ORX-encoding nucleic acid into the male pronuclei of a fertilized oocyte (*e.g.*, by microinjection, retroviral infection) and allowing the oocyte to develop in a pseudopregnant female foster animal. Sequences including GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843 can be introduced as a transgene into the genome of a non-human animal. Alternatively, a non-human homologue of the human ORX gene, such as a mouse ORX gene, can be isolated based on hybridization to the human ORX cDNA (described further *supra*) and used as a transgene. Intronic sequences and polyadenylation signals can also be included in the transgene to increase the efficiency of expression of the transgene. A tissue-specific regulatory sequence(s) can be operably-linked to the ORX transgene to direct expression of ORX protein to particular cells. Methods for generating transgenic animals via embryo manipulation and microinjection, particularly animals such as mice, have become conventional in the art and are described, for example, in U.S. Patent Nos. 4,736,866; 4,870,009; and 4,873,191; and Hogan, 1986. In: MANIPULATING THE MOUSE EMBRYO, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, N.Y. Similar methods are used for production of other transgenic animals. A transgenic founder animal can be identified based upon the presence of the ORX transgene in its genome and/or expression of ORX mRNA in tissues or cells of the animals. A transgenic founder animal can then be used to breed additional animals carrying the

transgene. Moreover, transgenic animals carrying a transgene-encoding ORX protein can further be bred to other transgenic animals carrying other transgenes.

To create a homologous recombinant animal, a vector is prepared which contains at least a portion of an ORX gene into which a deletion, addition or substitution has been introduced to thereby alter, *e.g.*, functionally disrupt, the ORX gene. The ORX gene can be a human gene, but more preferably, is a non-human homologue of a human ORX gene. For example, a mouse homologue of human ORX gene of GenBank Accession Numbers AF022649, AF073959-073989, AF127814-127907, and AF179716-179843, can be used to construct a homologous recombination vector suitable for altering an endogenous ORX gene in the mouse genome. In one embodiment, the vector is designed such that, upon homologous recombination, the endogenous ORX gene is functionally disrupted (*i.e.*, no longer encodes a functional protein; also referred to as a "knock out" vector).

Alternatively, the vector can be designed such that, upon homologous recombination, the endogenous ORX gene is mutated or otherwise altered but still encodes functional protein (*e.g.*, the upstream regulatory region can be altered to thereby alter the expression of the endogenous ORX protein). In the homologous recombination vector, the altered portion of the ORX gene is flanked at its 5'- and 3'-termini by additional nucleic acid of the ORX gene to allow for homologous recombination to occur between the exogenous ORX gene carried by the vector and an endogenous ORX gene in an embryonic stem cell. The additional flanking ORX nucleic acid is of sufficient length for successful homologous recombination with the endogenous gene. Typically, several kilobases of flanking DNA (both at the 5'- and 3'-termini) are included in the vector. *See, e.g.*, Thomas, *et al.*, 1987. *Cell* 51: 503 for a description of homologous recombination vectors. The vector is then introduced into an embryonic stem cell line (*e.g.*, by electroporation) and cells in which the introduced ORX gene has homologously-recombined with the endogenous ORX gene are selected. *See, e.g.*, Li, *et al.*, 1992. *Cell* 69: 915.

The selected cells are then injected into a blastocyst of an animal (*e.g.*, a mouse) to form aggregation chimeras. *See, e.g.*, Bradley, 1987. In: TERATOCARCINOMAS AND EMBRYONIC STEM CELLS: A PRACTICAL APPROACH, Robertson, ed. IRL, Oxford, pp. 113-152. A chimeric embryo can then be implanted into a suitable pseudopregnant female foster animal and the embryo brought to term. Progeny harboring the homologously-recombined DNA in their germ cells can

be used to breed animals in which all cells of the animal contain the homologously-recombined DNA by germline transmission of the transgene. Methods for constructing homologous recombination vectors and homologous recombinant animals are described further in Bradley, 1991. *Curr. Opin. Biotechnol.* 2: 823-829; PCT International Publication Nos.: WO 90/11354; WO 91/01140; WO 92/0968; and WO 93/04169.

In another embodiment, transgenic non-humans animals can be produced that contain selected systems that allow for regulated expression of the transgene. One example of such a system is the cre/loxP recombinase system of bacteriophage P1. For a description of the cre/loxP recombinase system, See, e.g., Lakso, *et al.*, 1992. *Proc. Natl. Acad. Sci. USA* 89: 6232-6236. Another example of a recombinase system is the FLP recombinase system of *Saccharomyces cerevisiae*. See, O'Gorman, *et al.*, 1991. *Science* 251:1351-1355. If a cre/loxP recombinase system is used to regulate expression of the transgene, animals containing transgenes encoding both the Cre recombinase and a selected protein are required. Such animals can be provided through the construction of "double" transgenic animals, e.g., by mating two transgenic animals, one containing a transgene encoding a selected protein and the other containing a transgene encoding a recombinase.

Clones of the non-human transgenic animals described herein can also be produced according to the methods described in Wilmut, *et al.*, 1997. *Nature* 385: 810-813. In brief, a cell (e.g., a somatic cell) from the transgenic animal can be isolated and induced to exit the growth cycle and enter G₀ phase. The quiescent cell can then be fused, e.g., through the use of electrical pulses, to an enucleated oocyte from an animal of the same species from which the quiescent cell is isolated. The reconstructed oocyte is then cultured such that it develops to morula or blastocyte and then transferred to pseudopregnant female foster animal. The offspring borne of this female foster animal will be a clone of the animal from which the cell (e.g., the somatic cell) is isolated.

Pharmaceutical Compositions

The ORX nucleic acid molecules, ORX proteins, and anti-ORX antibodies (also referred to herein as "active compounds") of the invention, and derivatives, fragments, analogs and homologs thereof, can be incorporated into pharmaceutical compositions suitable for

administration. Such compositions typically comprise the nucleic acid molecule, protein, or antibody and a pharmaceutically acceptable carrier. As used herein, "pharmaceutically acceptable carrier" is intended to include any and all solvents, dispersion media, coatings, antibacterial and antifungal agents, isotonic and absorption delaying agents, and the like, compatible with pharmaceutical administration. Suitable carriers are described in the most recent edition of Remington's Pharmaceutical Sciences, a standard reference text in the field, which is incorporated herein by reference. Preferred examples of such carriers or diluents include, but are not limited to, water, saline, finger's solutions, dextrose solution, and 5% human serum albumin. Liposomes and non-aqueous vehicles such as fixed oils may also be used. The use of such media and agents for pharmaceutically active substances is well known in the art. Except insofar as any conventional media or agent is incompatible with the active compound, use thereof in the compositions is contemplated. Supplementary active compounds can also be incorporated into the compositions.

The antibodies disclosed herein can also be formulated as immunoliposomes.

Liposomes containing the antibody are prepared by methods known in the art, such as described in Epstein et al., Proc. Natl. Acad. Sci. USA, 82: 3688 (1985); Hwang et al., Proc. Natl. Acad. Sci. USA, 77: 4030 (1980); and U.S. Pat. Nos. 4,485,045 and 4,544,545. Liposomes with enhanced circulation time are disclosed in U.S. Patent No. 5,013,556.

Particularly useful liposomes can be generated by the reverse-phase evaporation method with a lipid composition comprising phosphatidylcholine, cholesterol, and PEG-derivatized phosphatidylethanolamine (PEG-PE). Liposomes are extruded through filters of defined pore size to yield liposomes with the desired diameter. Fab' fragments of the antibody of the present invention can be conjugated to the liposomes as described in Martin et al., J. Biol. Chem., 257: 286-288 (1982) via a disulfide-interchange reaction. A chemotherapeutic agent (such as Doxorubicin) is optionally contained within the liposome. See Gabizon et al., J. National Cancer Inst., 81(19): 1484 (1989).

A pharmaceutical composition of the invention is formulated to be compatible with its intended route of administration. Examples of routes of administration include parenteral, *e.g.*, intravenous, intradermal, subcutaneous, oral (*e.g.*, inhalation), transdermal (*i.e.*, topical), transmucosal, and rectal administration. Solutions or suspensions used for parenteral,

intradermal, or subcutaneous application can include the following components: a sterile diluent such as water for injection, saline solution, fixed oils, polyethylene glycols, glycerine, propylene glycol or other synthetic solvents; antibacterial agents such as benzyl alcohol or methyl parabens; antioxidants such as ascorbic acid or sodium bisulfite; chelating agents such as ethylenediaminetetraacetic acid (EDTA); buffers such as acetates, citrates or phosphates, and agents for the adjustment of tonicity such as sodium chloride or dextrose. The pH can be adjusted with acids or bases, such as hydrochloric acid or sodium hydroxide. The parenteral preparation can be enclosed in ampoules, disposable syringes or multiple dose vials made of glass or plastic.

Pharmaceutical compositions suitable for injectable use include sterile aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersion. For intravenous administration, suitable carriers include physiological saline, bacteriostatic water, Cremophor EL™ (BASF, Parsippany, N.J.) or phosphate buffered saline (PBS). In all cases, the composition must be sterile and should be fluid to the extent that easy syringeability exists. It must be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof. The proper fluidity can be maintained, for example, by the use of a coating such as lecithin, by the maintenance of the required particle size in the case of dispersion and by the use of surfactants. Prevention of the action of microorganisms can be achieved by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, ascorbic acid, thimerosal, and the like. In many cases, it will be preferable to include isotonic agents, for example, sugars, polyalcohols such as manitol, sorbitol, sodium chloride in the composition. Prolonged absorption of the injectable compositions can be brought about by including in the composition an agent which delays absorption, for example, aluminum monostearate and gelatin.

Sterile injectable solutions can be prepared by incorporating the active compound (e.g., an ORX protein or anti-ORX antibody) in the required amount in an appropriate solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization.

Generally, dispersions are prepared by incorporating the active compound into a sterile vehicle that contains a basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, methods of preparation are vacuum drying and freeze-drying that yields a powder of the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

Oral compositions generally include an inert diluent or an edible carrier. They can be enclosed in gelatin capsules or compressed into tablets. For the purpose of oral therapeutic administration, the active compound can be incorporated with excipients and used in the form of tablets, troches, or capsules. Oral compositions can also be prepared using a fluid carrier for use as a mouthwash, wherein the compound in the fluid carrier is applied orally and swished and expectorated or swallowed. Pharmaceutically compatible binding agents, and/or adjuvant materials can be included as part of the composition. The tablets, pills, capsules, troches and the like can contain any of the following ingredients, or compounds of a similar nature: a binder such as microcrystalline cellulose, gum tragacanth or gelatin; an excipient such as starch or lactose, a disintegrating agent such as alginic acid, Primogel, or corn starch; a lubricant such as magnesium stearate or Sterotes; a glidant such as colloidal silicon dioxide; a sweetening agent such as sucrose or saccharin; or a flavoring agent such as peppermint, methyl salicylate, or orange flavoring.

For administration by inhalation, the compounds are delivered in the form of an aerosol spray from pressured container or dispenser which contains a suitable propellant, *e.g.*, a gas such as carbon dioxide, or a nebulizer.

Systemic administration can also be by transmucosal or transdermal means. For transmucosal or transdermal administration, penetrants appropriate to the barrier to be permeated are used in the formulation. Such penetrants are generally known in the art, and include, for example, for transmucosal administration, detergents, bile salts, and fusidic acid derivatives. Transmucosal administration can be accomplished through the use of nasal sprays or suppositories. For transdermal administration, the active compounds are formulated into ointments, salves, gels, or creams as generally known in the art.

The compounds can also be prepared in the form of suppositories (*e.g.*, with conventional suppository bases such as cocoa butter and other glycerides) or retention enemas for rectal delivery.

In one embodiment, the active compounds are prepared with carriers that will protect the compound against rapid elimination from the body, such as a controlled release formulation, including implants and microencapsulated delivery systems. Biodegradable, biocompatible polymers can be used, such as ethylene vinyl acetate, polyanhydrides, polyglycolic acid, collagen, polyorthoesters, and polylactic acid. Methods for preparation of such formulations will be apparent to those skilled in the art. The materials can also be obtained commercially from Alza Corporation and Nova Pharmaceuticals, Inc. Liposomal suspensions (including liposomes targeted to infected cells with monoclonal antibodies to viral antigens) can also be used as pharmaceutically acceptable carriers. These can be prepared according to methods known to those skilled in the art, for example, as described in U.S. Patent No. 4,522,811.

It is especially advantageous to formulate oral or parenteral compositions in dosage unit form for ease of administration and uniformity of dosage. Dosage unit form as used herein refers to physically discrete units suited as unitary dosages for the subject to be treated; each unit containing a predetermined quantity of active compound calculated to produce the desired therapeutic effect in association with the required pharmaceutical carrier. The specification for the dosage unit forms of the invention are dictated by and directly dependent on the unique characteristics of the active compound and the particular therapeutic effect to be achieved, and the limitations inherent in the art of compounding such an active compound for the treatment of individuals.

The nucleic acid molecules of the invention can be inserted into vectors and used as gene therapy vectors. Gene therapy vectors can be delivered to a subject by, for example, intravenous injection, local administration (*see, e.g.*, U.S. Patent No. 5,328,470) or by stereotactic injection (*see, e.g.*, Chen, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 3054-3057). The pharmaceutical preparation of the gene therapy vector can include the gene therapy vector in an acceptable diluent, or can comprise a slow release matrix in which the gene delivery vehicle is imbedded. Alternatively, where the complete gene delivery vector can be produced intact from recombinant

cells, *e.g.*, retroviral vectors, the pharmaceutical preparation can include one or more cells that produce the gene delivery system.

Antibodies specifically binding a protein of the invention, as well as other molecules identified by the screening assays disclosed herein, can be administered for the treatment of various disorders in the form of pharmaceutical compositions. Principles and considerations involved in preparing such compositions, as well as guidance in the choice of components are provided, for example, in Remington : The Science And Practice Of Pharmacy 19th ed. (Alfonso R. Gennaro, et al., editors) Mack Pub. Co., Easton, Pa.: 1995; Drug Absorption Enhancement : Concepts, Possibilities, Limitations, And Trends, Harwood Academic Publishers, Langhorne, Pa., 1994; and Peptide And Protein Drug Delivery (Advances In Parenteral Sciences, Vol. 4), 1991, M. Dekker, New York. If the antigenic protein is intracellular and whole antibodies are used as inhibitors, internalizing antibodies are preferred. However, liposomes can also be used to deliver the antibody, or an antibody fragment, into cells. Where antibody fragments are used, the smallest inhibitory fragment that specifically binds to the binding domain of the target protein is preferred. For example, based upon the variable-region sequences of an antibody, peptide molecules can be designed that retain the ability to bind the target protein sequence. Such peptides can be synthesized chemically and/or produced by recombinant DNA technology. See, *e.g.*, Marasco *et al.*, 1993 *Proc. Natl. Acad. Sci. USA*, 90: 7889-7893. The formulation herein can also contain more than one active compound as necessary for the particular indication being treated, preferably those with complementary activities that do not adversely affect each other. Alternatively, or in addition, the composition can comprise an agent that enhances its function, such as, for example, a cytotoxic agent, cytokine, chemotherapeutic agent, or growth-inhibitory agent. Such molecules are suitably present in combination in amounts that are effective for the purpose intended. The active ingredients can also be entrapped in microcapsules prepared, for example, by coacervation techniques or by interfacial polymerization, for example, hydroxymethylcellulose or gelatin-microcapsules and poly-(methylmethacrylate) microcapsules, respectively, in colloidal drug delivery systems (for example, liposomes, albumin microspheres, microemulsions, nano-particles, and nanocapsules) or in macroemulsions.

The formulations to be used for *in vivo* administration must be sterile. This is readily accomplished by filtration through sterile filtration membranes.

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Sustained-release preparations can be prepared. Suitable examples of sustained-release preparations include semipermeable matrices of solid hydrophobic polymers containing the antibody, which matrices are in the form of shaped articles, *e.g.*, films, or microcapsules. Examples of sustained-release matrices include polyesters, hydrogels (for example, poly(2-hydroxyethyl-methacrylate), or poly(vinylalcohol)), polylactides (U.S. Pat. No. 3,773,919), copolymers of L-glutamic acid and ethyl-L-glutamate, non-degradable ethylene-vinyl acetate, degradable lactic acid-glycolic acid copolymers such as the LUPRON DEPOT™ (injectable microspheres composed of lactic acid-glycolic acid copolymer and leuprolide acetate), and poly-D-(-)-3-hydroxybutyric acid. While polymers such as ethylene-vinyl acetate and lactic acid-glycolic acid enable release of molecules for over 100 days, certain hydrogels release proteins for shorter time periods.

The pharmaceutical compositions can be included in a container, pack, or dispenser together with instructions for administration.

Screening and Detection Methods

The isolated nucleic acid molecules of the invention can be used to express ORX protein (*e.g.*, via a recombinant expression vector in a host cell in gene therapy applications), to detect ORX mRNA (*e.g.*, in a biological sample) or a genetic lesion in an ORX gene, and to modulate ORX activity, as described further, below. In addition, the ORX proteins can be used to screen drugs or compounds that modulate the ORX protein activity or expression as well as to treat disorders characterized by insufficient or excessive production of ORX protein or production of ORX protein forms that have decreased or aberrant activity compared to ORX wild-type protein. In addition, the anti-ORX antibodies of the invention can be used to detect and isolate ORX proteins and modulate ORX activity. For example, ORX activity includes growth and differentiation, antibody production, and tumor growth.

The invention further pertains to novel agents identified by the screening assays described herein and uses thereof for treatments as described, *supra*.

Screening Assays

The invention provides a method (also referred to herein as a "screening assay") for identifying modulators, *i.e.*, candidate or test compounds or agents (*e.g.*, peptides,

peptidomimetics, small molecules or other drugs) that bind to ORX proteins or have a stimulatory or inhibitory effect on, *e.g.*, ORX protein expression or ORX protein activity. The invention also includes compounds identified in the screening assays described herein.

In one embodiment, the invention provides assays for screening candidate or test compounds which bind to or modulate the activity of the membrane-bound form of an ORX protein or polypeptide or biologically-active portion thereof. The test compounds of the invention can be obtained using any of the numerous approaches in combinatorial library methods known in the art, including: biological libraries; spatially addressable parallel solid phase or solution phase libraries; synthetic library methods requiring deconvolution; the "one-bead one-compound" library method; and synthetic library methods using affinity chromatography selection. The biological library approach is limited to peptide libraries, while the other four approaches are applicable to peptide, non-peptide oligomer or small molecule libraries of compounds. *See, e.g., Lam, 1997. Anticancer Drug Design 12: 145.*

A "small molecule" as used herein, is meant to refer to a composition that has a molecular weight of less than about 5 kD and most preferably less than about 4 kD. Small molecules can be, *e.g.*, nucleic acids, peptides, polypeptides, peptidomimetics, carbohydrates, lipids or other organic or inorganic molecules. Libraries of chemical and/or biological mixtures, such as fungal, bacterial, or algal extracts, are known in the art and can be screened with any of the assays of the invention.

Examples of methods for the synthesis of molecular libraries can be found in the art, for example in: DeWitt, *et al.*, 1993. *Proc. Natl. Acad. Sci. U.S.A.* 90: 6909; Erb, *et al.*, 1994. *Proc. Natl. Acad. Sci. U.S.A.* 91: 11422; Zuckermann, *et al.*, 1994. *J. Med. Chem.* 37: 2678; Cho, *et al.*, 1993. *Science* 261: 1303; Carrell, *et al.*, 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2059; Carrell, *et al.*, 1994. *Angew. Chem. Int. Ed. Engl.* 33: 2061; and Gallop, *et al.*, 1994. *J. Med. Chem.* 37: 1233.

Libraries of compounds may be presented in solution (*e.g.*, Houghten, 1992. *Biotechniques* 13: 412-421), or on beads (Lam, 1991. *Nature* 354: 82-84), on chips (Fodor, 1993. *Nature* 364: 555-556), bacteria (Ladner, U.S. Patent No. 5,223,409), spores (Ladner, U.S. Patent 5,233,409), plasmids (Cull, *et al.*, 1992. *Proc. Natl. Acad. Sci. USA* 89: 1865-1869) or on phage (Scott and Smith, 1990. *Science* 249: 386-390; Devlin, 1990. *Science* 249: 404-406; Cwirla, *et*

al., 1990. *Proc. Natl. Acad. Sci. U.S.A.* 87: 6378-6382; Felici, 1991. *J. Mol. Biol.* 222: 301-310; Ladner, U.S. Patent No. 5,233,409.).

In one embodiment, an assay is a cell-based assay in which a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface is contacted with a test compound and the ability of the test compound to bind to an ORX protein determined. The cell, for example, can be of mammalian origin or a yeast cell.

Determining the ability of the test compound to bind to the ORX protein can be accomplished, for example, by coupling the test compound with a radioisotope or enzymatic label such that binding of the test compound to the ORX protein or biologically-active portion thereof can be determined by detecting the labeled compound in a complex. For example, test compounds can be labeled with ^{125}I , ^{35}S , ^{14}C , or ^3H , either directly or indirectly, and the radioisotope detected by direct counting of radioemission or by scintillation counting. Alternatively, test compounds can be enzymatically-labeled with, for example, horseradish peroxidase, alkaline phosphatase, or luciferase, and the enzymatic label detected by determination of conversion of an appropriate substrate to product. In one embodiment, the assay comprises contacting a cell which expresses a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the test compound to preferentially bind to ORX protein or a biologically-active portion thereof as compared to the known compound.

In another embodiment, an assay is a cell-based assay comprising contacting a cell expressing a membrane-bound form of ORX protein, or a biologically-active portion thereof, on the cell surface with a test compound and determining the ability of the test compound to modulate (*e.g.*, stimulate or inhibit) the activity of the ORX protein or biologically-active portion thereof. Determining the ability of the test compound to modulate the activity of ORX or a biologically-active portion thereof can be accomplished, for example, by determining the ability of the ORX protein to bind to or interact with an ORX target molecule. As used herein, a "target molecule" is a molecule with which an ORX protein binds or interacts in nature, for example, a molecule on the surface of a cell which expresses an ORX interacting protein, a molecule on the

surface of a second cell, a molecule in the extracellular milieu, a molecule associated with the internal surface of a cell membrane or a cytoplasmic molecule. An ORX target molecule can be a non-ORX molecule or an ORX protein or polypeptide of the invention. In one embodiment, an ORX target molecule is a component of a signal transduction pathway that facilitates transduction of an extracellular signal (*e.g.* a signal generated by binding of a compound to a membrane-bound ORX molecule) through the cell membrane and into the cell. The target, for example, can be a second intercellular protein that has catalytic activity or a protein that facilitates the association of downstream signaling molecules with ORX.

Determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by one of the methods described above for determining direct binding. In one embodiment, determining the ability of the ORX protein to bind to or interact with an ORX target molecule can be accomplished by determining the activity of the target molecule. For example, the activity of the target molecule can be determined by detecting induction of a cellular second messenger of the target (*i.e.* intracellular Ca^{2+} , diacylglycerol, IP_3 , etc.), detecting catalytic/enzymatic activity of the target on an appropriate substrate, detecting the induction of a reporter gene (comprising an ORX-responsive regulatory element operatively linked to a nucleic acid encoding a detectable marker, *e.g.*, luciferase), or detecting a cellular response, for example, cell survival, cellular differentiation, or cell proliferation.

In yet another embodiment, an assay of the invention is a cell-free assay comprising contacting an ORX protein or biologically-active portion thereof with a test compound and determining the ability of the test compound to bind to the ORX protein or biologically-active portion thereof. Binding of the test compound to the ORX protein can be determined either directly or indirectly as described above. In one such embodiment, the assay comprises contacting the ORX protein or biologically-active portion thereof with a known compound which binds ORX to form an assay mixture, contacting the assay mixture with a test compound, and determining the ability of the test compound to interact with an ORX protein, wherein determining the ability of the test compound to interact with an ORX protein comprises determining the ability of the test compound to preferentially bind to ORX or biologically-active portion thereof as compared to the known compound.

1 In still another embodiment, an assay is a cell-free assay comprising contacting ORX
protein or biologically-active portion thereof with a test compound and determining the ability of
the test compound to modulate (*e.g.* stimulate or inhibit) the activity of the ORX protein or
biologically-active portion thereof. Determining the ability of the test compound to modulate the
5 activity of ORX can be accomplished, for example, by determining the ability of the ORX
protein to bind to an ORX target molecule by one of the methods described above for
determining direct binding. In an alternative embodiment, determining the ability of the test
compound to modulate the activity of ORX protein can be accomplished by determining the
ability of the ORX protein further modulate an ORX target molecule. For example, the
10 catalytic/enzymatic activity of the target molecule on an appropriate substrate can be determined
as described above.

11 In yet another embodiment, the cell-free assay comprises contacting the ORX protein or
biologically-active portion thereof with a known compound which binds ORX protein to form an
assay mixture, contacting the assay mixture with a test compound, and determining the ability of
15 the test compound to interact with an ORX protein, wherein determining the ability of the test
compound to interact with an ORX protein comprises determining the ability of the ORX protein
to preferentially bind to or modulate the activity of an ORX target molecule.

16 The cell-free assays of the invention are amenable to use of both the soluble form or the
membrane-bound form of ORX protein. In the case of cell-free assays comprising the
20 membrane-bound form of ORX protein, it may be desirable to utilize a solubilizing agent such
that the membrane-bound form of ORX protein is maintained in solution. Examples of such
solubilizing agents include non-ionic detergents such as n-octylglucoside, n-dodecylglucoside,
n-dodecylmaltoside, octanoyl-N-methylglucamide, decanoyl-N-methylglucamide, Triton[®]
X-100, Triton[®] X-114, Thesit[®], Isotridecypoly(ethylene glycol ether)_n, N-dodecyl--
25 N,N-dimethyl-3-ammonio-1-propane sulfonate, 3-(3-cholamidopropyl) dimethylamminiol-
1-propane sulfonate (CHAPS), or 3-(3-cholamidopropyl)dimethylamminiol-2-hydroxy-
1-propane sulfonate (CHAPSO).

26 In more than one embodiment of the above assay methods of the invention, it may be
desirable to immobilize either ORX protein or its target molecule to facilitate separation of
30 complexed from uncomplexed forms of one or both of the proteins, as well as to accommodate

automation of the assay. Binding of a test compound to ORX protein, or interaction of ORX protein with a target molecule in the presence and absence of a candidate compound, can be accomplished in any vessel suitable for containing the reactants. Examples of such vessels include microtiter plates, test tubes, and micro-centrifuge tubes. In one embodiment, a fusion protein can be provided that adds a domain that allows one or both of the proteins to be bound to a matrix. For example, GST-ORX fusion proteins or GST-target fusion proteins can be adsorbed onto glutathione sepharose beads (Sigma Chemical, St. Louis, MO) or glutathione derivatized microtiter plates, that are then combined with the test compound or the test compound and either the non-adsorbed target protein or ORX protein, and the mixture is incubated under conditions conducive to complex formation (*e.g.*, at physiological conditions for salt and pH). Following incubation, the beads or microtiter plate wells are washed to remove any unbound components, the matrix immobilized in the case of beads, complex determined either directly or indirectly, for example, as described, *supra*. Alternatively, the complexes can be dissociated from the matrix, and the level of ORX protein binding or activity determined using standard techniques.

Other techniques for immobilizing proteins on matrices can also be used in the screening assays of the invention. For example, either the ORX protein or its target molecule can be immobilized utilizing conjugation of biotin and streptavidin. Biotinylated ORX protein or target molecules can be prepared from biotin-NHS (N-hydroxy-succinimide) using techniques well-known within the art (*e.g.*, biotinylation kit, Pierce Chemicals, Rockford, Ill.), and immobilized in the wells of streptavidin-coated 96 well plates (Pierce Chemical). Alternatively, antibodies reactive with ORX protein or target molecules, but which do not interfere with binding of the ORX protein to its target molecule, can be derivatized to the wells of the plate, and unbound target or ORX protein trapped in the wells by antibody conjugation. Methods for detecting such complexes, in addition to those described above for the GST-immobilized complexes, include immunodetection of complexes using antibodies reactive with the ORX protein or target molecule, as well as enzyme-linked assays that rely on detecting an enzymatic activity associated with the ORX protein or target molecule.

In another embodiment, modulators of ORX protein expression are identified in a method wherein a cell is contacted with a candidate compound and the expression of ORX mRNA or protein in the cell is determined. The level of expression of ORX mRNA or protein in the

presence of the candidate compound is compared to the level of expression of ORX mRNA or protein in the absence of the candidate compound. The candidate compound can then be identified as a modulator of ORX mRNA or protein expression based upon this comparison. For example, when expression of ORX mRNA or protein is greater (*i.e.*, statistically significantly greater) in the presence of the candidate compound than in its absence, the candidate compound is identified as a stimulator of ORX mRNA or protein expression. Alternatively, when expression of ORX mRNA or protein is less (statistically significantly less) in the presence of the candidate compound than in its absence, the candidate compound is identified as an inhibitor of ORX mRNA or protein expression. The level of ORX mRNA or protein expression in the cells can be determined by methods described herein for detecting ORX mRNA or protein.

In yet another aspect of the invention, the ORX proteins can be used as "bait proteins" in a two-hybrid assay or three hybrid assay (*see, e.g.*, U.S. Patent No. 5,283,317; Zervos, *et al.*, 1993. *Cell* 72: 223-232; Madura, *et al.*, 1993. *J. Biol. Chem.* 268: 12046-12054; Bartel, *et al.*, 1993. *Biotechniques* 14: 920-924; Iwabuchi, *et al.*, 1993. *Oncogene* 8: 1693-1696; and Brent WO 94/10300), to identify other proteins that bind to or interact with ORX ("ORX-binding proteins" or "ORX-bp") and modulate ORX activity. Such ORX-binding proteins are also likely to be involved in the propagation of signals by the ORX proteins as, for example, upstream or downstream elements of the ORX pathway.

The two-hybrid system is based on the modular nature of most transcription factors, which consist of separable DNA-binding and activation domains. Briefly, the assay utilizes two different DNA constructs. In one construct, the gene that codes for ORX is fused to a gene encoding the DNA binding domain of a known transcription factor (*e.g.*, GAL-4). In the other construct, a DNA sequence, from a library of DNA sequences, that encodes an unidentified protein ("prey" or "sample") is fused to a gene that codes for the activation domain of the known transcription factor. If the "bait" and the "prey" proteins are able to interact, *in vivo*, forming an ORX-dependent complex, the DNA-binding and activation domains of the transcription factor are brought into close proximity. This proximity allows transcription of a reporter gene (*e.g.*, LacZ) that is operably linked to a transcriptional regulatory site responsive to the transcription factor. Expression of the reporter gene can be detected and cell colonies containing the

functional transcription factor can be isolated and used to obtain the cloned gene that encodes the protein which interacts with ORX.

The invention further pertains to novel agents identified by the aforementioned screening assays and uses thereof for treatments as described herein.

Detection Assays

Portions or fragments of the cDNA sequences identified herein (and the corresponding complete gene sequences) can be used in numerous ways as polynucleotide reagents. By way of example, and not of limitation, these sequences can be used to: (i) identify an individual from a minute biological sample (tissue typing); and (ii) aid in forensic identification of a biological sample. Some of these applications are described in the subsections, below.

Tissue Typing

The ORX sequences of the invention can be used to identify individuals from minute biological samples. In this technique, an individual's genomic DNA is digested with one or more restriction enzymes, and probed on a Southern blot to yield unique bands for identification. The sequences of the invention are useful as additional DNA markers for RFLP ("restriction fragment length polymorphisms," described in U.S. Patent No. 5,272,057).

Furthermore, the sequences of the invention can be used to provide an alternative technique that determines the actual base-by-base DNA sequence of selected portions of an individual's genome. Thus, the ORX sequences described herein can be used to prepare two PCR primers from the 5'- and 3'-termini of the sequences. These primers can then be used to amplify an individual's DNA and subsequently sequence it.

Panels of corresponding DNA sequences from individuals, prepared in this manner, can provide unique individual identifications, as each individual will have a unique set of such DNA sequences due to allelic differences. The sequences of the invention can be used to obtain such identification sequences from individuals and from tissue. The ORX sequences of the invention uniquely represent portions of the human genome. Allelic variation occurs to some degree in the coding regions of these sequences, and to a greater degree in the noncoding regions. It is estimated that allelic variation between individual humans occurs with a frequency of about once

per each 500 bases. Much of the allelic variation is due to single nucleotide polymorphisms (SNPs), which include restriction fragment length polymorphisms (RFLPs).

Each of the sequences described herein can, to some degree, be used as a standard against which DNA from an individual can be compared for identification purposes. Because greater numbers of polymorphisms occur in the noncoding regions, fewer sequences are necessary to differentiate individuals. The noncoding sequences can comfortably provide positive individual identification with a panel of perhaps 10 to 1,000 primers that each yield a noncoding amplified sequence of 100 bases. If predicted coding sequences are used, a more appropriate number of primers for positive individual identification would be 500-2,000.

Predictive Medicine

The invention also pertains to the field of predictive medicine in which diagnostic assays, prognostic assays, pharmacogenomics, and monitoring clinical trials are used for prognostic (predictive) purposes to thereby treat an individual prophylactically. Accordingly, one aspect of the invention relates to diagnostic assays for determining ORX protein and/or nucleic acid expression as well as ORX activity, in the context of a biological sample (*e.g.*, blood, serum, cells, tissue) to thereby determine whether an individual is afflicted with a disease or disorder, or is at risk of developing a disorder, associated with aberrant ORX expression or activity. Disorders associated with aberrant ORX expression of activity include, for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

The invention also provides for prognostic (or predictive) assays for determining whether an individual is at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. For example, mutations in an ORX gene can be assayed in a biological sample. Such assays can be used for prognostic or predictive purpose to thereby prophylactically treat an individual prior to the onset of a disorder characterized by or associated with ORX protein, nucleic acid expression, or biological activity.

Another aspect of the invention provides methods for determining ORX protein, nucleic acid expression or activity in an individual to thereby select appropriate therapeutic or prophylactic agents for that individual (referred to herein as "pharmacogenomics").

Pharmacogenomics allows for the selection of agents (*e.g.*, drugs) for therapeutic or prophylactic treatment of an individual based on the genotype of the individual (*e.g.*, the genotype of the individual examined to determine the ability of the individual to respond to a particular agent.)

Yet another aspect of the invention pertains to monitoring the influence of agents (*e.g.*, drugs, compounds) on the expression or activity of ORX in clinical trials.

These and other agents are described in further detail in the following sections.

Diagnostic Assays

An exemplary method for detecting the presence or absence of ORX in a biological sample involves obtaining a biological sample from a test subject and contacting the biological sample with a compound or an agent capable of detecting ORX protein or nucleic acid (*e.g.*, mRNA, genomic DNA) that encodes ORX protein such that the presence of ORX is detected in the biological sample. An agent for detecting ORX mRNA or genomic DNA is a labeled nucleic acid probe capable of hybridizing to ORX mRNA or genomic DNA. The nucleic acid probe can be, for example, a full-length ORX nucleic acid, or a portion thereof, such as an oligonucleotide of at least 15, 30, 50, 100, 250 or 500 nucleotides in length and sufficient to specifically hybridize under stringent conditions to ORX mRNA or genomic DNA. Other suitable probes for use in the diagnostic assays of the invention are described herein.

One agent for detecting ORX protein is an antibody capable of binding to ORX protein, preferably an antibody with a detectable label. Antibodies directed against a protein of the invention may be used in methods known within the art relating to the localization and/or quantitation of the protein (*e.g.*, for use in measuring levels of the protein within appropriate physiological samples, for use in diagnostic methods, for use in imaging the protein, and the like). In a given embodiment, antibodies against the proteins, or derivatives, fragments, analogs or homologs thereof, that contain the antigen binding domain, are utilized as pharmacologically-active compounds.

An antibody specific for a protein of the invention can be used to isolate the protein by standard techniques, such as immunoaffinity chromatography or immunoprecipitation. Such an antibody can facilitate the purification of the natural protein antigen from cells and of recombinantly produced antigen expressed in host cells. Moreover, such an antibody can be used to detect the antigenic protein (*e.g.*, in a cellular lysate or cell supernatant) in order to evaluate

the abundance and pattern of expression of the antigenic protein. Antibodies directed against the protein can be used diagnostically to monitor protein levels in tissue as part of a clinical testing procedure, *e.g.*, to, for example, determine the efficacy of a given treatment regimen. Detection can be facilitated by coupling (*i.e.*, physically linking) the antibody to a detectable substance.

5 Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent materials, bioluminescent materials, and radioactive materials. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, β -galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, 10 fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin, and examples of suitable radioactive material include ^{125}I , ^{131}I , ^{35}S or ^3H .

Antibodies can be polyclonal, or more preferably, monoclonal. An intact antibody, or a 15 fragment thereof (*e.g.*, Fab or F(ab')_2) can be used. The term "labeled", with regard to the probe or antibody, is intended to encompass direct labeling of the probe or antibody by coupling (*i.e.*, physically linking) a detectable substance to the probe or antibody, as well as indirect labeling of the probe or antibody by reactivity with another reagent that is directly labeled. Examples of indirect labeling include detection of a primary antibody using a fluorescently-labeled secondary 20 antibody and end-labeling of a DNA probe with biotin such that it can be detected with fluorescently-labeled streptavidin. The term "biological sample" is intended to include tissues, cells and biological fluids isolated from a subject, as well as tissues, cells and fluids present within a subject. That is, the detection method of the invention can be used to detect ORX mRNA, protein, or genomic DNA in a biological sample *in vitro* as well as *in vivo*. For example, 25 *in vitro* techniques for detection of ORX mRNA include Northern hybridizations and *in situ* hybridizations. *In vitro* techniques for detection of ORX protein include enzyme linked immunosorbent assays (ELISAs), Western blots, immunoprecipitations, and immunofluorescence. *In vitro* techniques for detection of ORX genomic DNA include Southern hybridizations. Furthermore, *in vivo* techniques for detection of ORX protein include 30 introducing into a subject a labeled anti-ORX antibody. For example, the antibody can be

labeled with a radioactive marker whose presence and location in a subject can be detected by standard imaging techniques.

In one embodiment, the biological sample contains protein molecules from the test subject. Alternatively, the biological sample can contain mRNA molecules from the test subject or genomic DNA molecules from the test subject. A preferred biological sample is a peripheral blood leukocyte sample isolated by conventional means from a subject.

In one embodiment, the methods further involve obtaining a control biological sample from a control subject, contacting the control sample with a compound or agent capable of detecting ORX protein, mRNA, or genomic DNA, such that the presence of ORX protein, mRNA or genomic DNA is detected in the biological sample, and comparing the presence of ORX protein, mRNA or genomic DNA in the control sample with the presence of ORX protein, mRNA or genomic DNA in the test sample.

The invention also encompasses kits for detecting the presence of ORX in a biological sample. For example, the kit can comprise: a labeled compound or agent capable of detecting ORX protein or mRNA in a biological sample; means for determining the amount of ORX in the sample; and means for comparing the amount of ORX in the sample with a standard. The compound or agent can be packaged in a suitable container. The kit can further comprise instructions for using the kit to detect ORX protein or nucleic acid.

Prognostic Assays

The diagnostic methods described herein can furthermore be utilized to identify subjects having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. For example, the assays described herein, such as the preceding diagnostic assays or the following assays, can be utilized to identify a subject having or at risk of developing a disorder associated with ORX protein, nucleic acid expression or activity. Such disorders include for example, neurodegenerative, cell proliferative, angiogenic, hematopoietic, immunological, inflammatory, and tumor-related disorders and/or pathologies.

Alternatively, the prognostic assays can be utilized to identify a subject having or at risk for developing a disease or disorder. Thus, the invention provides a method for identifying a disease or disorder associated with aberrant ORX expression or activity in which a test sample is obtained from a subject and ORX protein or nucleic acid (*e.g.*, mRNA, genomic DNA) is

detected, wherein the presence of ORX protein or nucleic acid is diagnostic for a subject having or at risk of developing a disease or disorder associated with aberrant ORX expression or activity. As used herein, a "test sample" refers to a biological sample obtained from a subject of interest. For example, a test sample can be a biological fluid (*e.g.*, serum), cell sample, or tissue.

Furthermore, the prognostic assays described herein can be used to determine whether a subject can be administered an agent (*e.g.*, an agonist, antagonist, peptidomimetic, protein, peptide, nucleic acid, small molecule, or other drug candidate) to treat a disease or disorder associated with aberrant ORX expression or activity. For example, such methods can be used to determine whether a subject can be effectively treated with an agent for a disorder. Thus, the invention provides methods for determining whether a subject can be effectively treated with an agent for a disorder associated with aberrant ORX expression or activity in which a test sample is obtained and ORX protein or nucleic acid is detected (*e.g.*, wherein the presence of ORX protein or nucleic acid is diagnostic for a subject that can be administered the agent to treat a disorder associated with aberrant ORX expression or activity).

The methods of the invention can also be used to detect genetic lesions in an ORX gene, thereby determining if a subject with the lesioned gene is at risk for a disorder characterized by aberrant cell proliferation and/or differentiation. In various embodiments, the methods include detecting, in a sample of cells from the subject, the presence or absence of a genetic lesion characterized by at least one of an alteration affecting the integrity of a gene encoding an ORX-protein, or the misexpression of the ORX gene. For example, such genetic lesions can be detected by ascertaining the existence of at least one of: (i) a deletion of one or more nucleotides from an ORX gene; (ii) an addition of one or more nucleotides to an ORX gene; (iii) a substitution of one or more nucleotides of an ORX gene, (iv) a chromosomal rearrangement of an ORX gene; (v) an alteration in the level of a messenger RNA transcript of an ORX gene, (vi) aberrant modification of an ORX gene, such as of the methylation pattern of the genomic DNA, (vii) the presence of a non-wild-type splicing pattern of a messenger RNA transcript of an ORX gene, (viii) a non-wild-type level of an ORX protein, (ix) allelic loss of an ORX gene, and (x) inappropriate post-translational modification of an ORX protein. As described herein, there are a large number of assay techniques known in the art which can be used for detecting lesions in an ORX gene. A preferred biological sample is a peripheral blood leukocyte sample isolated by

conventional means from a subject. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

In certain embodiments, detection of the lesion involves the use of a probe/primer in a polymerase chain reaction (PCR) (*see, e.g.*, U.S. Patent Nos. 4,683,195 and 4,683,202), such as anchor PCR or RACE PCR, or, alternatively, in a ligation chain reaction (LCR) (*see, e.g.*, Landegran, *et al.*, 1988. *Science* 241: 1077-1080; and Nakazawa, *et al.*, 1994. *Proc. Natl. Acad. Sci. USA* 91: 360-364), the latter of which can be particularly useful for detecting point mutations in the ORX-gene (*see*, Abravaya, *et al.*, 1995. *Nucl. Acids Res.* 23: 675-682). This method can include the steps of collecting a sample of cells from a patient, isolating nucleic acid (*e.g.*, genomic, mRNA or both) from the cells of the sample, contacting the nucleic acid sample with one or more primers that specifically hybridize to an ORX gene under conditions such that hybridization and amplification of the ORX gene (if present) occurs, and detecting the presence or absence of an amplification product, or detecting the size of the amplification product and comparing the length to a control sample. It is anticipated that PCR and/or LCR may be desirable to use as a preliminary amplification step in conjunction with any of the techniques used for detecting mutations described herein.

Alternative amplification methods include: self sustained sequence replication (*see*, Guatelli, *et al.*, 1990. *Proc. Natl. Acad. Sci. USA* 87: 1874-1878), transcriptional amplification system (*see*, Kwoh, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA* 86: 1173-1177); Q β Replicase (*see*, Lizardi, *et al.*, 1988. *BioTechnology* 6: 1197), or any other nucleic acid amplification method, followed by the detection of the amplified molecules using techniques well known to those of skill in the art. These detection schemes are especially useful for the detection of nucleic acid molecules if such molecules are present in very low numbers.

In an alternative embodiment, mutations in an ORX gene from a sample cell can be identified by alterations in restriction enzyme cleavage patterns. For example, sample and control DNA is isolated, amplified (optionally), digested with one or more restriction endonucleases, and fragment length sizes are determined by gel electrophoresis and compared. Differences in fragment length sizes between sample and control DNA indicates mutations in the sample DNA. Moreover, the use of sequence specific ribozymes (*see, e.g.*, U.S. Patent No.

5,493,531) can be used to score for the presence of specific mutations by development or loss of a ribozyme cleavage site.

In other embodiments, genetic mutations in ORX can be identified by hybridizing a sample and control nucleic acids, e.g., DNA or RNA, to high-density arrays containing hundreds or thousands of oligonucleotide probes. See, e.g., Cronin, *et al.*, 1996. *Human Mutation* 7: 244-255; Kozal, *et al.*, 1996. *Nat. Med.* 2: 753-759. For example, genetic mutations in ORX can be identified in two dimensional arrays containing light-generated DNA probes as described in Cronin, *et al.*, *supra*. Briefly, a first hybridization array of probes can be used to scan through long stretches of DNA in a sample and control to identify base changes between the sequences by making linear arrays of sequential overlapping probes. This step allows the identification of point mutations. This is followed by a second hybridization array that allows the characterization of specific mutations by using smaller, specialized probe arrays complementary to all variants or mutations detected. Each mutation array is composed of parallel probe sets, one complementary to the wild-type gene and the other complementary to the mutant gene.

In yet another embodiment, any of a variety of sequencing reactions known in the art can be used to directly sequence the ORX gene and detect mutations by comparing the sequence of the sample ORX with the corresponding wild-type (control) sequence. Examples of sequencing reactions include those based on techniques developed by Maxim and Gilbert, 1977. *Proc. Natl. Acad. Sci. USA* 74: 560 or Sanger, 1977. *Proc. Natl. Acad. Sci. USA* 74: 5463. It is also contemplated that any of a variety of automated sequencing procedures can be utilized when performing the diagnostic assays (see, e.g., Naeve, *et al.*, 1995. *Biotechniques* 19: 448), including sequencing by mass spectrometry (see, e.g., PCT International Publication No. WO 94/16101; Cohen, *et al.*, 1996. *Adv. Chromatography* 36: 127-162; and Griffin, *et al.*, 1993. *Appl. Biochem. Biotechnol.* 38: 147-159).

Other methods for detecting mutations in the ORX gene include methods in which protection from cleavage agents is used to detect mismatched bases in RNA/RNA or RNA/DNA heteroduplexes. See, e.g., Myers, *et al.*, 1985. *Science* 230: 1242. In general, the art technique of "mismatch cleavage" starts by providing heteroduplexes of formed by hybridizing (labeled) RNA or DNA containing the wild-type ORX sequence with potentially mutant RNA or DNA obtained from a tissue sample. The double-stranded duplexes are treated with an agent that cleaves

single-stranded regions of the duplex such as which will exist due to basepair mismatches between the control and sample strands. For instance, RNA/DNA duplexes can be treated with RNase and DNA/DNA hybrids treated with S₁ nuclease to enzymatically digesting the mismatched regions. In other embodiments, either DNA/DNA or RNA/DNA duplexes can be treated with hydroxylamine or osmium tetroxide and with piperidine in order to digest mismatched regions. After digestion of the mismatched regions, the resulting material is then separated by size on denaturing polyacrylamide gels to determine the site of mutation. See, e.g., Cotton, *et al.*, 1988. *Proc. Natl. Acad. Sci. USA* 85: 4397; Saleeba, *et al.*, 1992. *Methods Enzymol.* 217: 286-295. In an embodiment, the control DNA or RNA can be labeled for detection.

In still another embodiment, the mismatch cleavage reaction employs one or more proteins that recognize mismatched base pairs in double-stranded DNA (so called "DNA mismatch repair" enzymes) in defined systems for detecting and mapping point mutations in ORX cDNAs obtained from samples of cells. For example, the mutY enzyme of *E. coli* cleaves A at G/A mismatches and the thymidine DNA glycosylase from HeLa cells cleaves T at G/T mismatches. See, e.g., Hsu, *et al.*, 1994. *Carcinogenesis* 15: 1657-1662. According to an exemplary embodiment, a probe based on an ORX sequence, e.g., a wild-type ORX sequence, is hybridized to a cDNA or other DNA product from a test cell(s). The duplex is treated with a DNA mismatch repair enzyme, and the cleavage products, if any, can be detected from electrophoresis protocols or the like. See, e.g., U.S. Patent No. 5,459,039.

In other embodiments, alterations in electrophoretic mobility will be used to identify mutations in ORX genes. For example, single strand conformation polymorphism (SSCP) may be used to detect differences in electrophoretic mobility between mutant and wild type nucleic acids. See, e.g., Orita, *et al.*, 1989. *Proc. Natl. Acad. Sci. USA*: 86: 2766; Cotton, 1993. *Mutat. Res.* 285: 125-144; Hayashi, 1992. *Genet. Anal. Tech. Appl.* 9: 73-79. Single-stranded DNA fragments of sample and control ORX nucleic acids will be denatured and allowed to renature. The secondary structure of single-stranded nucleic acids varies according to sequence, the resulting alteration in electrophoretic mobility enables the detection of even a single base change. The DNA fragments may be labeled or detected with labeled probes. The sensitivity of the assay may be enhanced by using RNA (rather than DNA), in which the secondary structure is more

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sensitive to a change in sequence. In one embodiment, the subject method utilizes heteroduplex analysis to separate double stranded heteroduplex molecules on the basis of changes in electrophoretic mobility. *See, e.g., Keen, et al., 1991. Trends Genet. 7: 5.*

5 In yet another embodiment, the movement of mutant or wild-type fragments in polyacrylamide gels containing a gradient of denaturant is assayed using denaturing gradient gel electrophoresis (DGGE). *See, e.g., Myers, et al., 1985. Nature 313: 495.* When DGGE is used as the method of analysis, DNA will be modified to insure that it does not completely denature, for example by adding a GC clamp of approximately 40 bp of high-melting GC-rich DNA by PCR. In a further embodiment, a temperature gradient is used in place of a denaturing gradient
10 to identify differences in the mobility of control and sample DNA. *See, e.g., Rosenbaum and Reissner, 1987. Biophys. Chem. 265: 12753.*

Examples of other techniques for detecting point mutations include, but are not limited to, selective oligonucleotide hybridization, selective amplification, or selective primer extension. For example, oligonucleotide primers may be prepared in which the known mutation is placed
15 centrally and then hybridized to target DNA under conditions that permit hybridization only if a perfect match is found. *See, e.g., Saiki, et al., 1986. Nature 324: 163; Saiki, et al., 1989. Proc. Natl. Acad. Sci. USA 86: 6230.* Such allele specific oligonucleotides are hybridized to PCR amplified target DNA or a number of different mutations when the oligonucleotides are attached to the hybridizing membrane and hybridized with labeled target DNA.

20 Alternatively, allele specific amplification technology that depends on selective PCR amplification may be used in conjunction with the instant invention. Oligonucleotides used as primers for specific amplification may carry the mutation of interest in the center of the molecule (so that amplification depends on differential hybridization; *see, e.g., Gibbs, et al., 1989. Nucl. Acids Res. 17: 2437-2448*) or at the extreme 3'-terminus of one primer where, under appropriate
25 conditions, mismatch can prevent, or reduce polymerase extension (*see, e.g., Prossner, 1993. Tibtech. 11: 238*). In addition it may be desirable to introduce a novel restriction site in the region of the mutation to create cleavage-based detection. *See, e.g., Gasparini, et al., 1992. Mol. Cell Probes 6: 1.* It is anticipated that in certain embodiments amplification may also be performed using *Taq* ligase for amplification. *See, e.g., Barany, 1991. Proc. Natl. Acad. Sci. USA 88: 189.* In such cases, ligation will occur only if there is a perfect match at the 3'-terminus
30

of the 5' sequence, making it possible to detect the presence of a known mutation at a specific site by looking for the presence or absence of amplification.

The methods described herein may be performed, for example, by utilizing pre-packaged diagnostic kits comprising at least one probe nucleic acid or antibody reagent described herein, which may be conveniently used, *e.g.*, in clinical settings to diagnose patients exhibiting symptoms or family history of a disease or illness involving an ORX gene.

Furthermore, any cell type or tissue, preferably peripheral blood leukocytes, in which ORX is expressed may be utilized in the prognostic assays described herein. However, any biological sample containing nucleated cells may be used, including, for example, buccal mucosal cells.

The invention will be further described in the following examples, which do not limit the scope of the invention described in the claims.

EXAMPLE 1: Cloning and analysis of ORX-like sequences in primates and mouse.

The isolation of ORX-related sequences has been described in Rouquier et al., *Nature Genet.* (1998) 18, 243-50 and Rouquier et al. (1998) *Hum. Mol. Genet.* 7, 1337-1345. Briefly, 100 ng of genomic DNA from each species was subjected to PCR using consensus ORX primers OR5B-OR3B (OR5B (TM2), 5'-CCCATGTA(T/C)TT(G/C/T)TT(C/T)CTC(A/G/T)(G/C)(C/T)AA(C/T)(T/C)T(G/A)TC-3' ; PMY(F/L)FL(S/A/T/G/C)NLS ; OR3B (TM7), (SEQ ID NO: 432) 5'-AG(A/G)C(A/T)(A/G)TAIATGAAIGG(A/G)TTCAICAT-3' (SEQ ID NO:433) ; M(L/F/V/I)NPF(I/M)Y(S/C)L) (SEQ ID NO:434). *See* Ben-Arie et al., (1994) *Hum. Molec. Genet.* 3, 229-35. A second pair of consensus primers, OR3.1-OR7.1 (OR3.1 (TM3), 5'-GCIATGGCITA(C/T)GA(C/T)(A/C)GITA-3' (SEQ ID NO:435) ; AMAYD(S/R)Y (SEQ ID NO:436) ; OR7.1 (TM7), 5'-A(A/G)I(G/C)(A/T)(A/G)TA(A/G/T)AT(A/G)AAIGG(A/G)TT-3' (SEQ ID NO:437); NPFY(S/R/T/C/W)(L/F)(SEQ ID NO:438), was also used to amplify primate ORX sequences. *See* Freitag et al. (1998) *J. Comp. Physiol.* 183, 635-50 and Freitag et al., (1999) *Gene* 226, 165-74.

PCR products were subcloned in the TA vector (InVitrogen), and recombinant clones were identified by PCR. Sequencing of the ORX sequences was performed and sequences were assembled and analyzed. The following species were studied: human (*Homo sapiens*, HSA), chimpanzee (*Pan troglodytes*, PTR), gorilla (*Gorilla gorilla*, GGO), orangutan (*Pongo pygmaeus*, PPY), gibbon (*Hylobates lar*, HLA), macaque (*Macaca sylvanus*, MSY), baboon (*Papio papio*, PPA), marmoset (*Callithrix jacchus*, CJA), squirrel-monkey (*Saimiri sciureus*, SSC, and *Saimiri boliviensis*, SBO), lemur (*Eulemur fulvus*, EFU, and *Eulemur rubriventer*, ERU), and mouse (*Mus musculus domesticus*, MMU). In addition, a few zebrafish (*Danio rerio*, DRE) sequences were also characterized using primers OR3.1-OR7.1.

Pairwise sequence comparisons and multiple alignments were performed using Gap and PileUp from the GCG package (Wisconsin Package version 8).

EXAMPLE 2: Construction and screening of an ORX-specific mouse sublibrary.

Mouse ORX clones obtained by PCR as described above were gridded in 96-well microtiter dishes (1536 clones in 8 plates). For hybridization screening, the clones were robot-spotted in duplicate on high-density filters as described in Rouquier et al. (1999) *Mamm. Genome* 10, 1172-75.. Approximately 90% of the clones were identified as ORX genes. This library was screened to identify clones hybridizing to human ORX pseudogene sequences. Human plasmid DNA probes were radiolabeled to a specific activity of 108-109 cpm/ μ g by random hexamer priming using (-32P)-dCTP (Amersham) as described in Feinberg et al. (1983) *Anal. Biochem.* 132, 6-13. Filter hybridizations were carried out under standard hybridization conditions, and exposed to Kodak X-ray film at -80°C. See Rouquier et al., (1993) *Genomics* 17, 330-40.

Three human ORX probes were used: OR1-72, OR912-47, OR15-71 (DDBJ/GenBank accession numbers U86218, U86230, U86296 respectively).

EXAMPLE 3: Sequence analysis of mouse ORX sequences.

To test whether mammals thought to be microsmatic or macrosmatic differ in the fraction of pseudogenes in their ORX repertoire, the ORX sequences in the mouse genome were surveyed. A mouse sublibrary enriched for ORX-related sequences amplified by PCR from the mouse genome was constructed, and nineteen randomly selected mouse ORX clones were sequenced. All 19 have an uninterrupted open-reading frame (ORF) and are potentially functional. These sequences group primarily in family 1 and vary from ~52 to >99% NSI. In addition, in an attempt to bias in favor of selecting mouse ORX pseudogenes, a search for mouse ORX sequences homologous to human pseudogenes was performed. One member was chosen from three different ORX pseudogene families: clones 1-72, 15-71 and 912-47 from chromosomes 1, 15 and 11, respectively. *See Rouquier et al., (1998) Nature Genet. 18, 243-50.* Each of these genes belongs to one of the 3 main groups of human ORX sequences and has accumulated a number of mutations such as stop codons and indel frameshifts. *See id.* The amino-acid sequence identity between these three ranges from 31% to 41%.

High density filters from the mouse ORX sublibrary were then hybridized separately with the three human pseudogene probes at a high stringency. Fourteen clones were sequenced on both strands. These sequences showed 38% to 53% ASI to the human sequences used to select them, indicating that they are not the orthologs of the human pseudogenes. All have an uninterrupted ORF from TM2 to TM7. Together, 33 mouse ORX sequences were sequenced, none of which contained characteristic features of pseudogenes.

OTHER EMBODIMENTS

While the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims.